THE IRON TRADE REVIEW

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Laying Foundation for Greater Prosperity

Curtailment of Railway Buying Regarded as Temporary—Wire and Merchant Pipe to be Advanced—Low Fabricating Prices

The decisions rendered in the railroad rate cases are receiving widespread attention in the steel trade, and much speculation is being indulged in as to their probable effects. While some buyers who cater to the railroads seem to have become more cautious in closing contracts for their future requirements until they can determine more accurately what the future policy of the railroads will be, the trade generally has received with calmness the action of the commission, which some of the keenest observers of business conditions declare has placed railroad securities on a more substantial basis than ever before existed, and has paved the way for a period of great prosperity among the railroads. The opinion in well posted circles is that while the railroads may temporarily curtail their purchases, which have not been liberal for years, the situation will right itself in due season through the impossibility of the companies prolonging indefinitely the meeting of needs which have been allowed to accumulate steadily. While a few cancellations of railroad equipment are noted, resulting in one case in the request for the cancellation of pig iron, some good inquiries and orders for cars have come out in the past few days, and in some centers, particularly in Pittsburg, specifications against contracts for rails and other products are reported undiminished. The Atlantic Coast Line has come into the market for 1,400 box cars, 100 flat cars and 50 phosphate cars, and the Western Maryland for 500 steel hopper cars. The Boston Elevated has placed 40 steel subway coaches with the Standard Steel Car Co., and 20 steel elevated coaches with the Pressed Steel Car Co. The Ann Arbor railroad has placed 50 box cars and 50 refrigerator cars with the Standard Steel Car Co. The Wabash Pittsburg Terminal Railway Co. has placed an order for 1,000 steel hopper cars, 500 to be built by the Pressed Steel Car Co., and an equal number by the Standard Steel Car Co., Pittsburg.

Structural Material

The structural material makers, at a meeting in New York the past week, discussed the situation of their branch of the industry. Some instances of very low fabricating prices being named, especially in southeastern territory, have occasioned some reports of cutting in plain shapes, but these reports are not true, as prices of plain material are firm. Awards of the week include 4,000 tons for the Delaware & Hudson shops at Watervliet, N. Y., to the McClintic-Marshall Construction Co.; 1,500 tons for the Georgia Coast & Piedmont railroad, to the Virginia Bridge & Iron Works; 1,200 tons for the Woodward building, Washington, to the Baltimore Bridge Co.; 2,000 tons for a wharf shed, New Orleans, to the Fort Pitt Bridge Works; 5,342 tons of miscellaneous contracts awarded in Chicago.

Pig Iron

While in some parts of the country there is more hesitancy in pig iron, generally, attributed to the railroad freight rate decision, the strength of the market is not impaired. The southern situation is stronger, and shipments from the Birmingham district have been heavy. An extensive buying movement is believed to be under way in the Chicago territory. There is increased activity in basic in Philadelphia, St. Louis and Pittsburg. A sale of 1,000 tons of Bessemer has been made at $15, valley.

Wire and Pipe Advances

Wire manufacturers are expected to advance prices $1 a ton within a few days. The wire business is reported excellent. An advance in merchant pipe is also expected within a few days. Tube makers are now receiving many requests to hurry forward shipments, an experience which they have not had for months.

Coke and Scrap

Prices of both foundry and furnace coke are somewhat higher than they were early in February. Eastern furnace interests are showing more anxiety to contract and in the Pittsburg district, a steel company has covered for its requirements for the remainder of the year, aggregating about 100,000 tons, at about $1.80, ovens. Although for the most part the strength of the old material market is well maintained, there is not as much activity as there was a week ago. There are some indications that scrap prices have been advanced too rapidly.

Corporation Activities

Daily bookings of the Steel Corporation for February were between 35,000 and 40,000 tons, compared with about 30,000 tons in January. The Corporation's new business is apparently not affected by the railroad rate decision. If the railroads were suddenly to place large orders they might not be able to obtain very prompt delivery from some mills.

WORLD'S IRON MARKETS

PITTSBURG

Rate Decision Has Little Effect—February's Good Record.

Office of THE IRON TRADE REVIEW,
510 Park Building, Feb. 28.

The improvement in the iron and steel trade which began about the middle of January continued through the month of February, with the result that practically every steel company in this territory reports a larger volume of business in February than for the initial month of the year. Buying in practically all lines has become more general and consumers are showing a disposition to cover for future requirements at today's prices. The decision of the interstate commerce commission against the proposed advance in freight rates, while a distinct surprise, has had little effect, so far, upon general market con ditions. In fact, one or two local companies report that specifications received from the railroads since the decision was handed down have been heavier than at any time this year.

The market on crude steel is making an excellent showing. As a result of the heavy tonnage entered on mill books during the month of February, which shows a big gain over the initial month, most mills in this section are in a comfortable position and are not anxious to take orders, even for early shipment, at today's prices. Slight premiums are still being paid on open-hearth billets and sheet bars and forging steel and a general advance in the price of crude steel would not be unexpected. For the first time in several months, the leading interest is operating its steel mills to capacity.

Sales of prompt furnace coke have been made during the week at $1.60, ovens, as compared with $1.40, ovens, the price established by actual sales at the beginning of the month. A steel company west of Pittsburg has closed for its full requirements of furnace coke over the remainder of the year, aggregating upward of 100,000 tons, at about $1.75, ovens. Some sellers are asking slightly higher prices for second half. Additional sales of basic pig iron are noted, and the market, as a whole, shows a firmer tone. Prices of old material are firm and additional buying is noted, although users of heavy melting steel are not buying as freely as a week ago.

Shipments of tin plate are exceedingly heavy. Users of sheets are specifying for second quarter and mill operations have been increased. Demand for steel bars is good and some large orders have been placed. Miscellaneous business in plates and pipe is moderately fair, although less activity is noted in the structural steel market.

Pig Iron.—Additional buying of basic pig iron in this market is noted. There has also been enough buying of other grades to show that the market is firmer than at any time in months. So far, trading has been confined to early needs, although in some instances consumers are quietly sounding the market with a view of covering for a period of five or six months. At the present time, there is not a great deal of written inquiry pending. Practically all selling of basic during the past few weeks has been done by one or two interests, as valley furnaces are not inclined to sell below $14, valley. In addition to the sales of round tonnages of basic reported several days ago, a consumer located in territory immediately southwest of Pittsburg is understood to have closed for its requirements over the next several months, aggregating several thousand tons, the iron to come from a nearby furnace. A steel company along the Allegheny river has also taken a round tonnage of basic for delivery over the next few months at about $13.75, valley. Stocks in the hands of middlemen have been reduced considerably during the past week.

Notwithstanding reports of Bessemer pig iron having been offered at low prices, a local foundry interest has taken about 1,000 tons, on its inquiry put out several days ago for from 4,000 to 5,000 tons, at $15, valley. Inquiries for Bessemer pending at present involve lots of from 200 to 1,000 tons each.

A local malleable company has taken 2,500 tons of malleable pig iron for early delivery. The market on malleable appears to be firmer and is quotable at from $13.75 to $14, valley. In December and January, numerous sales of this grade were made at $13.50, valley.

Practically all sellers are asking $14, valley, for No. 2 foundry for both prompt and first half shipment, although this figure probably could be shaded on desirable business. Trading during the past week has been confined chiefly to small lots. A local car company is in the market for 1,500 tons of No. 2 foundry for delivery over the next four months. Demand for gray forge is light and prices show no change. Hall furnace of the Republic Iron & Steel Co., at Sharon, Pa., has been started. We quote the market as follows:

(Prompt Shipment.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.75
Basic, Pittsburg	14.65
No. 2 foundry, Pittsburg	14.65
Gray forge, Pitsburg	14.15
Malleable, Pittsburg	14.65

(First Half.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	14.00
Basic, Pittsburg	14.90
No. 2 foundry, Pittsburg	14.90
Gray forge, Pittsburg	14.40
Malleable, Pittsburg	14.65

Ferro-Alloys.—A local steel company has closed for 300 tons of 50 per cent ferro-silicon at less than $55, Pittsburg. Inquiry for 50 per cent ferro-silicon and ferro-manganese is light, as users are covered for their early needs.

We quote ferro-manganese at $37.50 to $38, Baltimore, for prommpt and first half. The freight rate from Baltimore to Pittsburg is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $54.50 to $55, Pittsburg, for prompt and first half; 12 per cent, $25; 11 per cent $24; 10 per cent, $23, f. o. b. Jisco and Ashland furnaces. The freight rate to Pittsburg is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—Specifications against contracts for plates are moderately heavy and there is a fair run of miscellaneous business. Car orders are still being held up, although indications point to increased business of this character within the next few months, notwithstanding the recent ruling on freight rates. The Lehigh & New England railroad has placed an order

with the Cambria Steel Co., Johnstown, Pa., for 500 steel hopper cars and the Pressed Steel Car Co. will build 100 steel mine cars for the Gulf Smokeless Coal Co., of West Virginia, and five postal cars for the Chesapeake & Ohio railroad. Definite action on the inquiry of the Wabash-Pittsburg Terminal Railroad Co. for 1,000 coal cars will be taken this week. The Allegheny County Light Co., Pittsburg, Pa., has prepared plans for a large gas holder to be erected in the Pittsburg territory, which will require approximately 3,500 tons of plates and other plain material. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.40c. Extras are as follows, per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 innches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½ inch to and including 3-16 inch plate on thin edge, 01.10c; under 3-16 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—Some fairly large contracts for sheets have been placed at today's prices for delivery over the second quarter. Specifications throughout the month of February have been in excess of those for the first month of the year. Mill operations have been materially increased, between 65 and 70 per cent of the total sheet mill capacity being in operation. Some of the independent mills are running full time. Prices are firm. We quote prices as follows, with $1 a ton added as the delivered price in the Pittsburg district:

Blue annealed sheets, No. 10 gage, 1.65c; box annealed sheets, No. 28 gage, 2.20c; galvanized sheets, No. 28 gage, 3.20c; painted roofing sheets, 1.55c per square for No. 28 gage, 2½-inch corrugation; galvanized roofing sheets, 2.75c per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—The tin plate market continues to be one of the most active branches of the steel trade, specifications during the past week being heavier than for any corresponding period this year. Shipments in February show a heavy gain over January and the outlook for the remainder of the first half of the year is very promising. A few additional mills have been started and practically all serviceable mills are now in operation. The base price on tin plate is as follows:

Coke tin plate, 10-pound basis, 14 x 20, $3.70, f. o. b. mill, Pittsburg district.

Rails and Track Material.—Notwithstanding the recent ruling of the interstate commerce commission against the increase in freight rates, the railroads continue to specify freely against contracts for standard rails and mills continue to operate on the same basis as a few weeks ago, with the result that orders entered on mill books in February make a favorable showing as compared with past months. Orders for light rails booked during the past week aggregate several thousand tons and indications point to increased business from this source in March. Some fairly large orders for spikes and track bolts have been placed, but as a general rule railroads are not covering very far ahead. We quote the market as follows, the base price on open-hearth rails being 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight off 40 to 45 pounds, $26.50 to $27, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; track bolts, 2.30c, Pittsburg.

RAILROAD SPIKES.

4½, 5 and 5½ x $\frac{9}{16}$	$1.55
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x $\frac{7}{16}$	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x $\frac{5}{16}$	.60
2 x $\frac{5}{16}$	.80

BOAT SPIKES.

¾-inch square, 12 to 24-inch. long	$0.15
⅝-inch. square, 8 to 16-inch. long	.15
½-inch. square, 6 to 16-inch. long	.15
$\frac{7}{16}$-inch. square, 6 to 12-inch. long	.20
⅜-inch. square, 4 to 12-inch. long	.30
$\frac{5}{16}$-inch. square, 4 to 8-inch. long	.45
¼-inch. square, 4 to 8-inch. long	.75
¼-inch. square, 3 to 3½-inch. long	1.00

⅜ and $\frac{7}{16}$ shorter than 4 inches, ¼ cent extra.

Steel.—This market has shown a decided gain during the month of February. Not only have orders entered on mill books during the month exceeded those of January, but operations have been increased materially and premiums of from 50 cents to $1 a ton have been paid on open-hearth billets and sheet bars and forging billets. Most companies in this territory report a larger gain in orders passed for entry on mill books in February than shown in January or December. The leading interest is now operating all of its steel plants for the first time in several months. Practically all manufacturers of billets and sheet bars are in a very comfortable position for the next three months and are not anxious to take business at present prices. While there has been no general change in the price situation, some companies are still receiving premiums on open-hearth sheet bars and forging billets. Trading during the past week has been confined chiefly to 1,000 and 2,000-ton lots, as most users are covered by contract. We quote the market as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $23, with the usual extras for size and analysis, and open-hearth rolling billets, $23. Bssemer sheet and tin bars are quoted at $24, and open-hearth sheet bars are quoted at $24, makers' mill, Pittsburg or Youngstown, with full freight to destination added. Forging billets are quoted at $28 to $28.50, Pittsburg.

Hoops and Bands.—No particularly large awards for hoops and bands have been made in this territory, but total bookings for February show a gain over any corresponding period for the past several months. Specifications are slightly heavier. We quote the market as follows:

Hoops in carload lots, 1.45c to 1.50c; in less than carload lots, 1.60c to 1.65c; bands, 1.40c, base, with net extras, as per standard steel.

Merchant Bars.—There has been fairly heavy buying of steel bars for second quarter delivery during the past few weeks and additional mills have been started. The market is very firm at 1.40c, Pittsburg, and manufacturers are not quoting this price for delivery beyond the first half. New business and specifications against contracts for bar iron are heavier than for last month, and, while most mills are quoting 1.40c, Pittsburg, as the absolute minimum, a few small sales have been made below this figure. The market on shafting is only fairly active. We quote the market as follows:

Common iron bars, 1.40c, Pittsburg; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under 3-inch, 1.50c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 55 per cent in carloads and 50 per cent in less than carloads, delivered in base territory.

Muck Bar.—This market is decidedly firmer than on Feb. 1, although there has not been any important trading during the past week. We quote the best grades of muck bar at $30, Pittsburg.

Structural. — Miscellaneous business in structural steel during the week has been fairly heavy, although this market as a whole is not so active as a month ago. The Fort Pitt Bridge Co., Pittsburg, has been awarded a contract for the W. H. Kernaghan Wharf shed at New Orleans, which will require 2,000 tons of structural steel and will cost approximately $100,000. Bids will be asked within a few days for the construction of the piers for the proposed bridge across the Allegheny

river in the Point district, Pittsburg, and bids for the structural steel work will be asked about the middle of March. The new bridge will cost approximately $1,000,000, of which $210,000 will be used for the construction of three piers. We quote the market as follows:

Beams and channels, 15 inches and under, 1.40c; over 15 inches, 1.50c; zees, 1.40c; tees, 1.45c; angles, from 3 to 6 inches, 1.40c; over 6 inches, 1.50c; universal and sheared plates, 6¼ inches wide and wider, 1.40c.

Merchant Pipe.—A fair volume of miscellaneous business in pipe has been booked during the month and some large orders, including one for 20 miles of 16-inch steel pipe for a western company, are being negotiated. It is expected that the Riverside plant of the National Tube Co. will be in full operation early next week. Independent manufacturers are also operating on a more satisfactory basis than last month. Demand for iron pipe is only moderately heavy. We quote the following official discounts in carload lots, subject to the usual preferential discount to the larger buyers, merchant pipe, where specified, being offered in from ⅛ to 6 inches:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Butt weld.			
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch.....	72	58	68	54
½ inch	75	63	71	59
¾ to 1½ inch	79	69	75	65
2 to 3 inches.....	80	70	76	66
	Lap weld.			
2 inches	76	66	72	62
2½ to 4 inches.....	78	68	74	64
4½ to 6 inches.....	77	67	73	63
7 to 12 inches.....	75	59	71	55
EXTRA STRONG, PLAIN ENDS.				
	Butt weld.			
⅛, ¼, ⅜ inch	69	59	65	55
½ inch	74	68	70	64
¾ to 1½ inch	78	72	74	68
2 to 3 inches	79	73	75	69
EXTRA STRONG, PLAIN ENDS.				
	Lap weld.			
2 inches	75	69	71	65
2½ to 4 inches.....	77	71	73	67
4½ to 6 inches.....	76	70	72	66
7 to 8 inches.....	69	59	65	55
9 to 12 inches.....	64	54	60	50
DOUBLE EXTRA STRONG, PLAIN ENDS.				
	Butt weld.			
½ inch	64	58	60	54
¾ to 1½ inch	67	61	63	57
2 to 3 inches.....	69	63	65	59
DOUBLE EXTRA STRONG, PLAIN ENDS.				
	Lap weld.			
2 inches	65	59	61	55
2½ to 4 inches.....	67	61	63	57
4½ to 6 inches.....	66	60	62	56
7 to 8 inches.....	59	49	55	45

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

Boiler Tubes.—Specifications against contracts for locomotive and merchant boiler tubes show a slight gain and indications point to increased activity next month. New business is not very heavy. We quote the market as follows:

	Steel.	Iron.
1 to 1½ inch.....	49	43
1¾ to 2¼ inch.....	61	43
2½ inch	63	48
2½ to 5 inch.....	69	55
6 to 13 inch	60	43

2½ inch and smaller, over 18 feet, 10 per cent net extra.
2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destination east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

Wire Products.—This branch of the steel industry has made an excellent showing during the month of February, some of the independent companies establishing a new record in the volume of business handled. Some fairly large contracts for plain wire and wire nails at $1.55 and $1.75, Pittsburg, respectively, have been placed for delivery over the next 60 days. Specifications have been heavy throughout the month, although some companies report a slight falling off during the past week. So far, the trade has not been advised regarding any proposed change in prices. With the opening of the building season manufacturers expect greater activity in this branch. We quote the market as follows:

Wire nails, jobbers' carload lots, $1.75; retailers' carload lots, $1.80, cut nails, jobbers' carload lots, $1.65 to $1.70; painted barb wire, jobbers' carload lots, $1.75, retailers' carload lots, $1.80, with 30c for galvanizing; plain wire to jobbers in carloads, $1.55, and to dealers, in carloads; $1.60, polished staples, $1.75; galvanized staples, $2.05.

Wire Rods.—Mills continue to quote $29, Pittsburg, for wire rods and scattered sales have been made at this figure, although the bulk of the trading has been confined to early needs. We quote $29, Pittsburg, for Bessemer and open-hearth rods.

Coke.—Prices of both furnace and foundry coke are somewhat higher than at the beginning of February. Connellsville furnace coke for March shipment has been sold at $1.60, ovens, a local consumer having taken a round tonnage at this figure. A steel company with works west of Pittsburg has closed for its full requirements of furnace coke for the remainder of the year, aggregating upward of 100,000 tons, at a price understood to be about $1.80, ovens. Some sellers are quoting $2, ovens, for last half. Other consumers who have been buying in the open market from month to month are negotiating for their full requirements over the year. Sellers of foundry coke report more general buying in small lots and as a result low quotations on prompt foundry coke appear to have disappeared. The furnace interests, composed chiefly of the H. C. Frick Coke Co., have been firing their foundry ovens during the past month, until now they have 70 per cent of them in operation, producing 61 per cent of their capacity. The merchant operators have about 60 per cent of their ovens in blast. We quote standard Connellsville furnace coke for prompt shipment at from $1.55 to $1.60, ovens, and for second half at from $1.75 to $2, ovens. High grade Connellsville foundry coke we quote at $2, ovens, for prompt shipment; on contract from $2.25 to $2.50, ovens. The Connellsville *Courier's* figures for the week ending Feb. 18, show 26,231 active ovens with an output of 322,765 tons, as compared with 25,873 active ovens and a production of 323,333 tons the previous week.

Old Material.—Prices of the various grades of old material are very firm, but the market has not shown much activity during the past few days in the way of sales, due partly to the recent freight rate decision. The lull in this market is regarded as a temporary one, as several large consumers are covered only for early needs and will be obliged to enter the market in the near future. A Bessemer steel interest west of Pittsburg has sold about 5,000 tons of heavy melting steel at about $14.50, mill. A steel company just east of Pittsburg, which recently closed for about 18,000 tons of heavy melting steel and bundled sheet scrap, has taken an additional 2,000 tons of bundled sheet scrap at about $12, Pittsburg, delivered. Scattered sales of heavy melting steel at from $14.75 to $15 are noted. Other transactions include from 1,000 to 2,000 tons of rerolling rails, machine shop turnings and No. 1 cast scrap. We quote, gross tons, delivered in the Pittsburg district, including Monessen, Sharon, Steubenville, Brackenridge and Follansbee, as follows:

Heavy melting scrap	$14.75 to 15.00
Rerolling rails	15.00 to 15.50
Bundled sheet scrap	11.75 to 12.25
Iron axles	24.00 to 24.50
Old iron rails	15.00 to 15.25
No. 1 wrought scrap	13.50 to 14.00
Old car wheels	13.75 to 14.25
Low phosphorus	17.00 to 18.00
Machine shop turnings	10.25 to 10.75
Cast borings	9.25 to 9.75
No. 1 cast scrap	14.00 to 14.50
Malleable	13.00 to 13.50
Stove plate	11.00 to 11.50

Railroad Rate Decision Checks New Business Temporarily.

Office of THE IRON TRADE REVIEW.
1328 Monadnock Block, Feb. 28.

The iron and steel business in the west is naturally deeply interested in the recent decision of the Interstate Commerce Commission restraining eastern and western railroads from advancing their freight rates. The decision, it must be admitted, is having a temporary dampening effect on the

market, but the influence exerted is largely sentimental. It is generally felt that the decision in the long run will have very little effect on the iron and steel business. In spite of the unfavorable railway attitude, the volume of business in the western market continues encouraging. Specifications for all lines of rolled steel are improving daily, and are much heavier than they were three or four weeks ago. The business taken by the leading interest during the first 20 days in February was only 10 per cent less than that booked during all of January. The total volume of pig iron sales has not diminished any, but the buying has broadened out to a large degree and is made up of a great number of small orders. Sentiment in the bar iron market is considerably improved and low prices have been withdrawn.

Pig Iron.—There is a heavy buying movement under way in the west and, while most of the purchasing is confined to comparatively small lots, the aggregate tonnage is unusually large. Some Chicago pig iron firms expect to do a larger business during February than they have for over a year. Malleable interests have closed for good tonnages during the past week and where possible are placing business for delivery throughout the year. For prompt shipment, $15.50 can be done on malleable Bessemer delivered in the Chicago territory, while the prevailing price for third and fourth quarter is $15.75 to $16. Makers of northern foundry iron are taking a large volume of business, but low prices still prevail. This makes it difficult to sell southern iron north or west of Chicago. We note a sale of 900 tons of northern No. 2 foundry to a Rockford, Ill., interest at $15, furnace, delivery over the last half. In some other instances, sales have been made at $15.25. Comparatively speaking, southern pig iron is somewhat stiffer. We note a sale of 600 tons of Sheffield iron to a Sparta, Mich., foundry for delivery from June to September at $16, f. o. b. Sparta. The freight rate being $4.75, this is equivalent to $11.25, Birmingham, on third quarter business. Some of the more optimistic southern furnaces, however, expect a general advance before the end of the first half and are refusing business for second half delivery, except at a prohibitive premium.

We quote the market for Chicago delivery, as follows:

(Prompt shipment and first half.)

Lake Superior charcoal	$17.50
Northern foundry No. 2	15.00
Southern foundry No. 2	15.35
Southern silveries, 5 per cent silicon	16.35
Jackson Co. silveries 8 per cent	19.40
Malleable Bessemer	15.50
Alabama basic	15.35

Billets.—There is only a routine amount of business in the market for forging billets. Makers of this product are endeavoring to establish a price of $30.60, Chicago, although independent interests are willing to make concessions of between $2 and $3 a ton on attractive business.

Merchant Bars.—Makers of iron bars seem satisfied that there is little to be gained by taking business at extremely low prices and there is very little shading in the market at present. The rapid increase in the price of scrap has had a considerable influence in bolstering up the price of bar iron. Mill orders for steel bars are improving, but the bar department is perceptibly quieter than other branches of the steel trade. The sluggishness exhibited by steel bars is ascribed to the fact that the comparatively low prices of bar iron and re-rolled steel cause buyers to hesitate about buying soft steel unless they can obtain a concession in the price. Makers, however, are maintaining the market very firmly and more or less of a deadlock between producers and consumers exists for the present. Specifications for all kinds of rolled merchant steel are gradually growing heavier.

We quote, Chicago delivery, as follows:

Bar iron, 1.30c to 1.35c; hard steel bars, re-rolled, 1.35c to 1.40c; soft steel bars and bands and small shapes, 1.58c to 1.63c, base; hoops, 1.68c to 1.73c; planished or smooth finished tire steel, 1.78c to 1.83c, base; iron finished tire steel, 1.73c, base; smooth finished machinery steel, 1 inch and larger, 1.98c; spring steel, 2.28c; crucible spring steel, 2.78c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 57 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.80c to 1.90c. per pound base; soft steel bars, 1.80c to 1.90c per pound base; soft steel hoops, 2.10c to 2.20c, full extras.

Structural Material.—Fabricators are quoting attractive prices, but the volume of structural contracts let is appreciably lighter than it was earlier in the month. Last week, the total tonnage involved in fabricating contracts reported let in the Chicago market was 5,342 tons, an increase of 1,546 tons over the amount reported the previous week. This total is made up of a large number of comparatively small orders, the largest being for only 950 tons. Included in the contracts let are the following: City of Rock Island, Ill., bridge spans, 220 tons, to Clinton Bridge & Iron Co.; coal storage building, for M. A. Hanna & Co., at Superior, Wis., 396 tons, to American Bridge Co.; Western Electric Co., buildings at Hawthorne, Ill., 208 tons, to Hansell-Elcock; Columbia Falls, Mont., two 220-ton pin spans, 138 tons, to American Bridge Co.; Lowell High School, San Francisco, Cal., 950 tons, to Pacific Rolling Mill Co.; Pier No. 8, U. S. Navy Yard, Bremerton, Wash., 200 tons, to American Bridge Co.; Pacific Telephone & Telegraph Co., office building at Spokane, Wash., 720 tons, to American Bridge Co.; Interurban Terminal building, Columbus, O., 385 tons, to McMyler-Interstate Co. of Cleveland, O.; Alcazar Theater, San Francisco, Cal., 510 tons, to Ralston Iron Works; surgical ward for city hospital, Los Angeles, 700 tons, to Milliken Bros. The Bucyrus-Vulcan Co., Evansville, Ind., has placed a contract for its buildings for a new plant, 800 tons, and the Anaconda Copper Mining Co., Anaconda, Mont., has let a fabricating contract to local interests for a dust chamber, 115 tons.

We quote, mill prices for structural shapes, f. o. b. Chicago, as follows:

Beams and channels, 15 inches and under, 1.58c to 1.63c. For extras, see Pittsburg report.

On structural material, out of store, we quote, as follows:

All angles, 3 inches and larger, including 6 inches, $1.80 to $1.90 per 100 pounds; angles over 6 inches, $1.90 to $2 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.80 per 100 pounds, base; channels, 3 inches and larger, $1.80 per 100 pounds, base.

Rails and Track Supplies.—The leading interest booked 7,500 tons of standard rails in scattering orders in the past week. Heavy orders from western roads are slow in coming out, although a large tonnage must be placed before very many weeks have passed. It is expected that the rate decision will result in holding up rail orders temporarily. The Chicago & Northwestern has awarded a heavy tonnage of track supplies to accompany its rail order announced last week. Light rails are quiet. Track supplies have not changed in price, but the market is firm and an advance of at least $1 a ton is now contemplated to take effect about April 1.

See Pittsburg report for prices on standard sections. We quote, light rails and track supplies, f. o. b. Chicago, as follows:

Light rails, carloads, 40 to 45-pound, 1.16c to 1.20½c; 30 to 35-pound, 1.19½c to 1.24c; 16, 20 and 25-pound, 1.20½c to 1.25c; 12-pound, 1.25c to 1.29½c.

Light section relayers, 45 pounds and under, subject to inspection, $21 to $23; standard section relaying rails, subject to inspection, $23.50 to $24.

Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.65c to 1.75c;

smaller size spikes, 1.70c, base; track bolts with square nuts, 2.15c to 2.25c, base.

Plates.—The local plate mill of the leading interest is operating at about 80 per cent capacity. Specifications are coming in steadily and mill schedules are in much better shape than they have been for some time. New business has improved since the last report.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches wide, 1.58c to 1.63c. For extras, see Pittsburg report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, 1.80c to 1.90c; from 72 inches to 96 inches wide, 1.90c to 2c; 3-16 inch up to and including 60 inches wide, 1.90c to 2c; 72 inches, 2.15c to 2.25c; No. 8, up to 60 inches wide, 1.95c to 2.05c. Flange quality and heads, 25c extra.

Sheets.—Mill business in sheets is fair and prices are being well maintained. The sheet trade is swinging toward its normal volume and the demand for galvanized sheets is appreciably better than for black.

We quote, store prices, f. o. b. Chicago, as follows:

Blue annealed No. 10, 2.10c to 2.20c; No. 12, 2.15c to 2.25c. Box annealed, No. 28, 2.75c to 2.85c. Galvanized, No. 28, 3.65c to 3.75c.

For mill prices, see Pittsburg report. Freight to Chicago, 18 cents.

Wire Products.—Orders for wire are better this week. The mild weather has had a very favorable effect on business in fencing and agricultural wire. Electrical interests are also ordering rather freely. Mill operations are increasing and the local mills of the leading interest are running at about 80 per cent to 85 per cent capacity. The trade seems favorably disposed toward the proposed advance of $1 a ton on all wire products which is now under consideration.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.08; painted barb wire, jobber's carload lots, $1.93; retailers' carload lots, $1.98; retailers', less than carload lots, $2.08; with 30c for galvanizing; plain wire to jobbers, $1.73; plain wire, retailers' carload lots, $1.78; staples, bright, $1.93.

Merchant Pipe and Tubes.—Exceedingly good weather is aiding building operations very materially and the demand for ordinary sizes of merchant pipe is heavy. Some spring business is also coming into the market and conditions are very much improved over those prevailing about the first of the year. Further improvement is expected and in some quarters there is talk of higher prices.

We quote, iron and steel pipe and tubes out of store, f. o. b. Chicago, as follows:

Iron and Steel Pipe Basing Prices.

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
⅛-⅜ inch	69.2	54.2	63.2	48.2
½ inch	72.2	59.2	66.2	53.2
2 in. to 3 in.	77.2	66.2	72.2	61.2
4½-6 inches	74.2	63.2	69.2	58.2
7-12 inches	71.2	54.2	67.2	50.2
EXTRA STRONG, PLAIN ENDS.				
½ inch	70.2	63.2	64.2	52.2
2-3 inches	75.2	68.2	61.2	55.2
7-8 inches	65.2	....	59.2	47.2
DOUBLE EXTRA STRONG.				
½ inch	58.2	50.2	....	....
2-3 inches	63.2	55.2	....	....
7-8 inches	53.2	41.2	....	....

Tubes.

	Lap weld steel. Per cent.	Charcoal iron. Per cent.	Shelby seamless. Per cent.
1 inch	38	..	57½
1¼ to 2¼ inch	52	38	35
2¾ to 5 inch	62	50	46

Cast Iron Pipe.—Specifications by gas companies are heavier and prices on cast iron pipe are somewhat better. Water pipe over 12 inches is now quoted $24, Chicago.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $25; 6 to 12 inches, $24.50, larger sizes, $24; gas pipe, $1 a ton higher.

Old Material.—The scrap market this week has failed to keep up the pace which had characterized it since the first of the month, and there has been a distinct slowing up in business and some falling off in prices. No. 1 railroad wrought is now quoted $11.80, Chicago, and it is not difficult for buyers to obtain the minimum quotations published herewith. Speculation in scrap has slacked up appreciably. The Great Northern received bids on March 1 on 10,230 tons of scrap on which the awards will be made March 7. This list includes 4,700 tons of No. 1 steel rails, 5 feet in length and over, 500 tons of frogs and switch points uncut, 590 tons of No. 1 railroad wrought and 390 tons of No. 2 railroad wrought. The Chicago, Rock Island & Pacific has issued a list amounting to 3,198 tons, on which bids were opened March 2. The principal items in this list are 200 tons of No. 1 steel rail, 200 tons of No. 3 steel rail, 400 tons of No. 1 railroad wrought and 250 tons of No. 2 railroad wrought.

We quote the market, for delivery in consumers' yards, Chicago, as follows:

GROSS TONS.

Old car wheels	$12.25 to 12.75
Old iron rails	15.00 to 15.50
Rerolling rails (5 ft and over)	13.50 to 14.00
Old steel rails (3 ft. and under)	12.50 to 13.00
Frogs, switches and guards	12.00 to 12.50
Heavy melting steel	12 00 to 12.50
Shoveling steel	11.50 to 12.00

NET TONS.

No. 1 R. R. wrought	$11 80 to 12.30
No. 2 R. R. wrought	10.80 to 11.30
Arch bars and transoms	14 50 to 15.00
Knuckles, couplers and springs	11.75 to 12.25
Shafting	15.75 to 16.25
Iron car axles	18.75 to 19.25
Steel car axles	17.75 to 18.25
Locomotive tires	16.50 to 17.00
Dealers' forge	10.50 to 11.00
Pipes and flues	9.00 to 9.50
No. 1 cast, 150 lbs. and less	12.25 to 12.75
No. 1 busheling	9.75 to 10.00
No. 2 busheling	8.50 to 9.00
No. 1 boiler cut	8.75 to 9.25
Boiler punchings	14.25 to 14.75
Cast and mixed borings	6.00 to 6.50
Machine shop turnings	7.00 to 7.50
Railroad malleable	10.75 to 11.25
Agricultural malleable	10.25 to 10.75
Stove plate and light cast scrap	10.25 to 10.75
Angle bars, splices, etc., iron	13.25 to 13.75
Angle bars, steel	11.25 to 11.75

The United Steel Co., of Canton, O., has moved its Chicago office from 33 Dearborn street to 1132 Commercial National Bank building. A. Schaeffer is sales agent in charge of the Chicago office.

CLEVELAND

Signs of Lake Activity Appear—Expiration of Pig Iron Contract.

Office of THE IRON TRADE REVIEW,
Penton Building, Feb. 28.

Iron Ore.—Signs of activity are already to be observed at some of the lower lake ports, the Pittsburg Steamship Co. having sent a number of its engineers to their boats. This company will, of courst, begin to operate as soon as navigation opens, but independent vessel owners will take their time about it, and an effort may be made to prevent a general starting of vessels until conditions demand it. Many believe June will be early enough to make a start. In spite of the fact that there has been more buying of pig iron for last half delivery, furnaces are showing no inclination to buy ore, or even to insist strongly upon prices being fixed.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $5; Mesabi Bessemer, $4.75; old range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.

Pig Iron.—The railway freight rate decision has had a tendency to check buying, especially of malleable, and one agency which sold 1,000 tons of malleable Monday expressed the opinion that the sale would have been 5,000 if the railroads had been allowed to advance freight rates. There is only very moderate inquiry, including 1,000 tons of southern from a northern Ohio stove interest. The contract made by M. A. Hanna & Co. with the Pittsburg Steel Co., in October, 1908, for 6,000 tons of pig iron monthly from the Dover, O., furnace, shipment to begin Nov. 1, 1908, will expire May 1, as the Pittsburg company has not

exercised its option to renew the contract for a second period of two and one-half years. The contract was on a basis of 7 per cent above actual cost of manufacture, and 1 per cent added for $1 advance in the market price of pig iron. We quote delivered in Cleveland over the remainder of the first half of the year, as follows:

No. 1 foundry	$14.50 to 14.75
No. 2 foundry	14.00 to 14.25
No. 2 Southern	15.35
Gray forge	13.50 to 14.00
Bessemer	15.90
Lake Superior charcoal	17.50
Jackson Co. 8 per cent silvery	19.00

Coke.—The coke market continues dull, and prices show little change. In fact, there has been a remarkable uniformity of price in coke for a long time.

Connellsville furnace coke, $1.55 to $1.60 for prompt delivery, and $1.75 for second half. Connellsville foundry coke, $1.95 to $2 for prompt, and $2 to $2.50 for second half.

Finished Material. — Reports are somewhat conflicting as to the effect of the railroad decision on the finished material market. Some sellers report a decrease, while others find that the volume of business continues very satisfactory. Nothing definite has developed as to the attitude of the railroads in this section. The Lake Shore has been receiving bids on from 1,700 to 1,800 tons of structural material. It has not awarded the contract, and it has been expected that two other railroads would place a fair tonnage of structural material, but this tonnage has not yet been inquired for. The Nickel Plate has already closed for 5,000 tons of rails, for which it has been in the market. Some minor structural contracts of from 200 to 400 tons have been awarded, including from 300 to 400 tons for the Merriam block, taken by the American Bridge Co. It is understood that the erection of the Leader building has been postponed for one year. Several buyers of plates have been making a determined effort to place orders at 1.35c, but have not succeeded in doing so. Prices of sheets are also firmly maintained.

Old Material.—A quieter tendency has developed in the local market the past few days, and both dealers and consumers welcome the change from the over-excited condition of the previous week. Both selling and buying had become difficult and conditions had been rapidly approaching those of a runaway market. Now, the return to sobered conditions is regarded as a relief. Material in some quantity is moving to mills, including both busheling and borings, but the stove plate scarcity continues. No changes in price have occurred and we quote, gross tons, f. o. b. Cleveland, as follows:

Old iron rails	$16.50 to 17.00
Old steel rails (under 6 ft.)	13.75 to 14.25
Old car wheels	13.50 to 14.00
Old steel boiler plate	11.50 to 12.00
Malleable iron (railroad)	13.25 to 13.75
Steel axles	19.00 to 19.50
Malleable iron (agricultural)	12.00 to 12.50
Heavy steel	13.50 to 14.00
Country mixed steel	11.50 to 12.00

We quote, net tons, as follows:

No. 1 R. R. wrought‡	$13.50 to 14.00
No. 1 busheling	11.50 to 12.00
No. 1 machine cast	12.50 to 13.00
Axle turnings	9.00 to 10.00
Machine shop turnings	8.50 to 9.00
Cast borings	7.50 to 8.00
Pipes and flues	9.00 to 9.50
Tank iron	8.50 to 9.00
Sheet iron	4.00 to 4.50
Wrought drillings	8.50 to 9.00
Cast borings	7.50 to 8.00
Wrought drillings	7.50 to 8.00

CINCINNATI

Lower Pig Iron Grades Scarce—High Silicon Iron Active.

Office of THE IRON TRADE REVIEW,
808 Provident Bank Bldg., Feb. 28.

Pig Iron.—The last two weeks have produced more actual business in pig iron than for some time past and this has given the market a somewhat firmer tone. Activity is not confined to any line as sales of considerable size have been made in basic, malleable, high silicon and ferro-manganese as well as the lower grades of iron that have been active for some time. The feature of the present market is the scarcity of low grade iron, No. 4 foundry being almost off the market. Practically all business in high silicon iron has been closed for the first half, as the majority of melters have contracted for their requirements in this line. Sudden activity in high silicon iron started selling on a basis of $16 to $16.50 for 8 per cent Jackson county, although the usual differential of 50 cents between the grades was not maintained and was cut to 25 cents for irons below 7 per cent silicon. An active market caused a raise of 50 cents a ton and high silicon iron is now quoted on a basis of $16.50 to $17 for 8 per cent iron. Sales to an Indiana melter, who took 600 tons of high silicon, a Detroit, Mich., melter who closed late last week for a fair tonnage of high silicon and several contracts in central Ohio for lots from 100 to 500 tons, are the most widely noted transactions in high silicon irons. Third quarter and last half business is being considered by selling interests, while some contracts are being closed for third quarter at prices very little, if any, above the quotations for second quarter. While some furnaces refuse to sell or consider contracts for third quarter, there is still considerable stock on hand in the yards of many of the southern furnaces, and some contracts have been let for third quarter on a basis of $11, Birmingham, for southern No. 2. Furnaces considering third quarter business are quoting $11.50 as a nominal price for southern No. 2, at Birmingham. Prices are firm at present quotations. There are many small inquiries for 150 to 200-ton lots, and several tentative inquiries for blocks of 1,000 tons. A melter in the northeastern part of the state is in the market for 800 tons of southern No. 2 foundry for the last half for equal monthly delivery. A local melter wants from 500 to 1,500 tons for prompt and second quarter delivery. A foundry interest in the southern part of Ohio inquires for from 400 to 600 tons of No. 2 and No. 4 foundry for shipment over the last half. Southern and central Ohio interests have recently closed for large tonnages of basic iron. Buyers generally are anxious to contract for second half at present prices, but in the most part sellers and buyers have not been able to get together on much tonnage. We quote prices based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, f. o. b. Cincinnati, as follows:

Southern foundry No. 2	$14.25	$14.75
Southern foundry No. 3	13.75	14.25
Southern foundry No. 4	13.25	13.50
Southern gray forge	13.00	13.25
Mottled	12.75	13.00
Southern No. 1 soft	14.75	15.25
Southern No. 2 soft	14.25	14.75
Standard Southern car wheel	25.25	25.75
Northern No. 2 foundry	15.20	15.45
Northern No. 3 foundry	14.70	14.95
Northern No. 4 foundry	14.20	14.45
Jackson county 8 per cent silicon	16.50 to 17.00	

Coke.—A little flurry in Connellsville furnace coke is the only activity in the coke market. Connellsville foundry coke has dropped a little and is quotable at $1.55, a decrease of 5 cents. The market is stronger than last week, although no business of any quantity has come out. A large number of ovens are still closed down awaiting a better movement. We quote prices from the various coke districts as follows:

	Prompt Shipment.	Contract to July 1.
Connellsville district:		
Foundry coke	$2.00 to 2.25	$2.25 to 2.50
Furnace coke	1.55 to 1.70	1.65 to 1.75
Wise county district:		
Foundry coke	2.00 to 2.10	2.00 to 2.10
Furnace coke	1.75	*Sliding scale basis.
Pocahontas district:		
Foundry coke	2.00 to 2.10	2.10 to 2.25
Furnace coke	1.75	1.75 to 1.85
New river:		
Foundry coke	2.50 to 3.25	2.60 to 3.25
Furnace coke	2.00 to 2.15	2.10 to 2.20

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16 2-3 per cent of the amount over $9 at which pig iron is quoted. This

is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—With prices very firm at 1.40c, Pittsburg base, steel bars and structural steel and steel bars continue strong. Considerable reinforcing steel is moving at present and sales following inquiries are somewhat better than last week.

Old Material.—A slightly better movement and sale of old material is following the stiffening in pig iron prices in the local market. Dealers can deliver large quantities of nearly any class of material, as their yards are fully stocked from the past three months of inactivity. We quote dealers' prices in Cincinnati yards as follows:

GROSS TONS.

Old iron rails, gross	$14.50 to 15.00
Old steel rerolling, gross	13.00 to 13.50
Old iron axles, gross	19.00 to 19.50
Steel melting scrap, gross	11.00 to 11.75
Car wheels, gross	11.00 to 12.00

NET TONS.

Old No. 1 R. R. wrought	$11.00 to 12.00
No. 1 machinery	11.00 to 13.00
No. 1 busheling	10.00 to 10.50
Stove plate	8.00 to 8.50
Heavy turnings	6.50 to 7.00
Cast borings	4.50 to 5.00
Grate bars	8.00 to 9.00
Sheet scrap, busheled	8.50 to 9.00
No. 1 cast scrap	10.50 to 12.00

PHILADELPHIA

Basic Inquiry For Third Quarter—Few Railroad Cancellations.

Feb. 27.

Pig Iron.—The appearance the past week of some inquiry by eastern steel makers for basic iron for third quarter shipments has occasioned considerable interest. One consumer has come out with a definite inquiry for 8,000 tons for this period of shipment and is expected to close in a day or two. Generally furnaces are quoting $15.50, delivered, for this shipment and some are rather indifferent to name even this figure which represents $1 above the last known sales made in the east for shipments running through April. Another basic consumer is also inquiring for some prompt iron. The basic market in the east continues very strong at $15, delivered, for prompt or second quarter shipment, and some sales at about this level are understood to have been made. Production of this metal is quite limited at present, being confined to the Warwick, Empire, Brooke, Thomas and Tidewater interests, and it is planned to blow out the large Warwick furnace shortly. One seller is understood to be booked full for first half. Low phosphorus iron continues fairly active in the east. One leading buyer has closed for an additional block of 5,000 tons for forward shipment at a reported price of about $21, delivered, another for 500 tons, while one inquiry for 1,000 tons for this territory is under negotiation. One of the Heckscher furnaces which has been on low phosphorus will fill the present orders upon its books and work up the ore on hand and then go onto basic to supply the increasing need for this iron of its controlling company, the Alan Wood Iron & Steel Co. The Warwick interest has acquired a block of the Spanish low phosphorus ore which the Heckscher furnace has been using and upon the delivery of this will put one of its small stacks on this grade of iron. The large Warwick furnace now on basic, it is still planned, however, will shortly be put out for re-lining. Since the announcement of the railroad freight rate decision, there has been some disposition on the part of prospective pig iron buyers, especially of foundry grades, to defer the final placing of this business. This lull, however, is not expected to be long continued, as fresh inquiry is still coming out freely. In the week under review some fair-sized selling of foundry grades was done both before and after the decision announcement. Several sales of 1,000-ton lots of Lehigh valley iron for first half at $15, furnace, for No. 2X, are noted. A cast iron pipe company closed for 3,000 tons of northern and southern forge and No. 3 and is reported to have secured some southern forge at $9.50, Birmingham, or $13.70, delivered. For the No. 3 southern about $10.25, Birmingham, or $14.45, delivered, was paid. The northern iron brought higher prices. Standard eastern Pennsylvania irons are quotable at from $15 to $15.25, furnace, for No. 2X. Mill iron is firmer at about $14.25, delivered. Virginia iron is selling quite uniformly at $13, furnace, for No. 2X for first quarter, with advances up to $13.50 asked and being obtained for second quarter.

For prompt and second quarter shipment we quote as follows:

No. 1X foundry	$16.00 to 16.50
No. 2X foundry	15.50 to 16.00
No. 2 plain	15.00 to 15.50
Standard gray forge	14.25 to 14.50
Basic	15.00
No. 2X Virginia	15.65 to 15.80
No. 2 Southern	15.00 to 15.50
Standard low phosphorus	21.00 to 21.50

Coke.—A greater desire of eastern furnaces to cover upon their forward requirements of coke is manifested. One interest has bought 4,000 tons monthly up to July at about $1.70, ovens, and another 2,000 tons monthly for the same period. A steel maker who is about to blow in a new furnace is out to cover for balance of the year requirements, estimated at 12,000 to 15,000 tons monthly. Several large brokers are reported to have sold short and have been absorbing spot coke, with the result that this market is stiffening. Makers are slow to quote beyond July at present. In the east Connellsville furnace coke is quoted at from about $1.50 to $1.60, ovens, for prompt, and $1.70 to $1.80 on forward deliveries. Connellsville foundry coke is $1.95 to $2.05 for prompt and $2 to $2.50, ovens, for future deliveries.

Finished Material.—Eastern steel makers, generally, take a calm and conservative view as to the probable effects upon the market of the unfavorable termination for the railroads of the freight rate question. While undoubtedly the announcement of the decision has caused buyers to proceed more slowly in the closing of contracts, during the past few days, pending some clearing of the atmosphere, it is felt that this condition is only temporary and a resumption of the improving character of the finished market is looked for soon. Little basis in fact can be found for any reports of extensive cancellations of material and equipment contracts by the railroads, but some instances of such an effect are to be noted in the east. The Baltimore & Ohio railroad has cancelled some contracts for car wheels, and some manufacturers of railroad material report that several other lines have withdrawn pending inquiries.

Prior to the announcement of the rate decision, the Atlantic Coast Line closed on its rail inquiry for from 10,000 to 12,000 tons. Eastern rail mills are booking a fair amount of business in small tonnages, street and interurban lines buying more liberally. The price advances recently put into effect by eastern bar iron makers are being well held and as a consequence of the smaller spread between iron and steel, there is some improvement in steel bars. The plate tonnage is being sustained from miscellaneous sources. Billet consumers seem more disposed to consider forward contracts at ruling prices. Sheets are improving and price advances in this line are not unlikely in the near future by reason of the higher semi-finished steel market.

Structural bookings of size are not especially plentiful. The Belmont Iron Works has taken 1,500 tons of angle bar construction for Panama canal pile work, upon which it was reported

low bidder. It is confirmed that the Panama canal commission will soon take bids on a large tonnage of plates and shapes for emergency dams. Bids are going in this week for the Curtis warehouse, this city, the steel for which it is now estimated may reach 3,000 tons. It is understood that revised plans will soon be out for the Epstein bargain house, Baltimore, which may increase the steel requirements, originally estimated at 3,500 tons. The Eisenlohr tobacco warehouse, Lancaster, Pa., to require 400 to 500 tons, is up. The Southern railroad has awarded the general contract for an office building and freight shed at Atlanta, Ga., 700 tons, which has been held up.

We quote for delivery in Philadelphia and vicinity as follows:

Structural shapes, 1.55c to 1.60c; steel plates, 1.55c; steel bars, 1.55c to 1.60c; refined bar iron, 1.35c to 1.40c; 4 x 4-inch open-hearth rolling billets, $25.40; forging billets, $30.40.

Old Material.—Eastern steel makers who have been buying heavy melting steel more actively of late. have not been closing as freely the past few days since the announcement of the railroad rate decision. Apparently they are pausing in their covering for their future needs until they have a true line upon any effect that may flow from the development. Several thousand tons of steel, however, have been disposed of this week around $14.50 and $14.75. delivered, one lot of 1,000 tons going at the higher figure at the close of the past week. Some makers on speculation have been paying higher than these prices. and one dealer is reported to have bought about 20,000 tons, taking it at different levels from $13. delivered, upward. The general attitude of scrap sellers is one of conservation in disposing of their holdings, as higher prices are expected. Rolling mill material has begun to move more freely and higher prices are being offered by these consumers. The movement in cast scrap is not very strong. Some steel companies whose stock in hand has not been large. have been paying higher than quoted prices on steel for immediate shipment. We quote gross tons, delivered in eastern Pennsylvania, as follows:

Old iron rails	$18.50 to 19.50
Old steel rails (re-rolling)	16.00 to 16.50
Heavy melting steel	14.50 to 15.00
Old car wheels	14.00 to 14.50
Old iron car axles	25.00 to 26.00
Old steel car axles	21.00 to 22.00
No. 1 R. R. wrought	17.50 to 18.00
Wrought pipe	14.00 to 14.50
Cast borings	9.75 to 10.00
Wrought turnings	10.00 to 10.50
Heavy cast scrap	14.00 to 14.50
Railroad malleable	12.50 to 13.00
Stove plate	11.50 to 12.00

ST LOUIS

Basic Inquiry is Fair and Foundry Iron Appears in Negotiations.

Feb. 27.

Pig Iron.—Despite the depressing effect that was predicted by the decision of the interstate commerce commission, pig iron and coke conditions are decidedly bright in the St. Louis territory. An inquiry was received by local sales agents this morning for 10,000 tons of northern basic for last half delivery to a large steel concern in St. Louis, one for 1,500 tons of Nos. 2 and 3 southern foundry iron for second and third quarter delivery to an Iowa concern, and scattering inquiries totalling from 5,000 to 6,000 tons, mostly for southern iron for last half delivery. One sale is reported today of 275 tons of southern iron, and another for 1,000 tons of northern foundry. Prices, also, manifest a disposition to harden. Although there is some No. 2 southern to be had as low as $11, Birmingham, it is said that iron at that price is scarce, and that $11.25 to $11.50 more nearly represents the actual condition of the market. Northern iron is quoted at $14.25, $14.50 and $14.75, Ironton, and the demand seems to be better than for quite a while. Quotations on southern iron, delivered, to which the Birmingham freight of $3.75 has been added, remain nominally as follows:

Southern No. 1	$15.25 to 15.75
Southern No. 2	14.75 to 15.25
Southern No. 3	14.25 to 14.75
Southern No. 4	13.75 to 14.25

Coke.—One sale of 2,000 tons of by-product coke is reported, and while there are no large inquiries out and sales have not been brisk, local sales agents are firm in the belief that the coke situation has improved materially since last week. There are indications that an advance of from 10 to 15 cents a ton may be registered before the end of the present week. Considerable demand is coming in from furnaces that have been closed down since last fall, and are starting up to work off the ore on their yards. Prices tabulated follow:

We quote 72-hour Connellsville foundry grades, $2.35 to $2.50 for whole of 1911; 72-hour foundry, $2 to $2.25, on tracks and for immediate delivery; 48-hour Connellsville furnace, $1.60 to $1.85; best 72-hour Virginia foundry, $2 to $2.35; 48-hour Virginia furnace, $1.60 to $1.85. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Old Material.—A slight advance has been made in quotations on some grades of pig iron, but the bullish tendency which the scrap market manifested ten days ago seems to have been given a set-back by the rate decision of the interstate commerce commission. However, the market is in much better shape than it has been for some time. Quotations, gross tons, run as follows:

Old car wheels	$13.50 to 14.00
Old iron rails	14.50 to 15.00
Rerolling rails (4 ft. and over)	13.00 to 13.50
Old steel rails (2 ft. and under)	12.00 to 12.50
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	12.00 to 12.50
Heavy melting steel	12.00 to 12.50
Shoveling steel	12.00 to 12.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$12.00 to 12.50
No. 2 R. R. wrought	11.00 to 11.50
Arch bars and transoms	14.00 to 14.50
Knuckles, couplers and springs	12.00 to 12.50
Shafting	15.00 to 15.50
Iron car axles	18.50 to 19.50
Steel car axles	18.50 to 19.50
Locomotive tires	14.50 to 15.00
No. 1 country wrought	9.50 to 10.00
Pipes and flues	9.00 to 9.50
No. 1 cast, 510 lbs. and less	12.00 to 12.50
No. 1 busheling	10.25 to 10.75
No. 2 busheling	7.00 to 7.50
No. 1 boiler cut	9.00 to 9.50
Boiler punchings	10.25 to 10.75
Cast and mixed borings	5.50 to 6.00
Machine shop turnings	7.50 to 8.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.00 to 9.50
Stove plate and light cast scrap	9.50 to 10.00
Angle splice bars, iron	13.25 to 13.75
Angle splice bars, steel	12.00 to 12.50

BUFFALO

Sellers Unwilling to Quote for Last Half Delivery.

Feb. 28.

Pig Iron.—A fairly large volume of inquiry is reported in foundry iron and the malleable grades, and some tonnage has been booked. though not very much, and in small lots. Foundries inquiring for forward shipment are met with the statement that the furnaces are not prepared to quote for shipment after July 1. This is because of the feeling that present low prices will not last and even for prompt shipment the furnaces are not seeking business as actively as formerly. While no general advance is reported there seems to be a tendency toward firmer prices. Furnace conditions seem to be very favorable and heavy shipments are being made. The Lackawanna Steel Co. now has five out of seven furnaces in operation and the New York State Steel Co.'s furnace is also in blast.

No. 1X	$14.00 to 14.50
No. 2X	14.00 to 14.50
No. 2 plain	13.75 to 14.25
No. 3	13.75 to 14.00
Gray forge	13.50 to 14.00
Malleable	13.75 to 14.00
Basic	14.50 to 15.75
Charcoal	17.25 to 18.00

Finished Products.—The agencies report business dull during the past week, and hold the recent decision of the Interstate Commerce Commission and the present talk of an extra session of congress in a large measure responsible. Some very promising busi-

ness that has been under negotiation has not matured. There is a shortage of all specifications. There are a few small inquiries, but orders are not coming forward as rapidly as was expected a few weeks ago.

Od Material.—The scrap market is lacking in activity. There seems to be very little buying or selling and the prices here given are largely nominal. We quote, f. o. b. Buffalo, as follows:

Heavy melting steel	$12.75 to 13.00
No. 1 railroad wrought scrap	14.75 to 15.25
No. 1 railroad and machine cast scrap	14.00 to 14.50
Old steel axles	18.50 to 19.00
Iron axles	23.00 to 24.00
Car wheels	13.75 to 14.25
Railroad malleable scrap	13.75 to 14.00
Machine shop turnings	7.00 to 7.25
Cast iron borings	6.50 to 6.75
Low phosphorus steel scrap	17.00 to 17.50
Old iron rails	16.75 to 17.25
Tank iron	10.75 to 11.25
Sheet iron	6.50 to 7.00
Pipes and flues	10.75 to 11.25
Stove plate	12.00 to 12.50
Grate bars	11.50 to 12.00
Boiler plate	11.50 to 12.00

NEW YORK

Rate Decision Makes Buyers More Cautious—Little Alarm Shown.

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Feb. 28.

Iron Ore.—Additional sales of Wabana, Newfoundland, ore have been made to eastern blast furnaces to take up the entire allotment of about 200,000 tons of this ore offered for new contracts at 7⅜ cents per unit, delivered, for this season's shipment. In addition, it is expected to bring in, as previously reported, about 75,000 tons on deferred contracts from last year, which will bring the Wabana movement up to normal proportions. Eastern furnaces are showing more interest in their ore requirements, but are giving their attention chiefly to those mixtures which represent the lowest cost. The higher priced foreign ores are apparently not attractive at this time and sellers are simply awaiting developments which will bring their ores into greater demand.

Pig Iron.—Consumers of iron have not been closing as freely the past few days, being influenced apparently by a desire to see how the trade in general accepts the settlement of the much-discussed railroad rate controversy. New inquiries, however, have continued to come out quite freely and the market with respect to negotiations, shows little diminution of activity. Makers continue more firmly entrenched in their price views, which have been gradually strengthening with the sustained interest of consumers in covering on their forward requirements. In no district has the condition of weak prices been more apparently reversed than with the Buffalo makers. The recent low selling done there into different territories, including New England, central Pennsylvania and Canada as well, has comfortably filled the order books of these furnaces and has made them more independent, so that low prices have been generally withdrawn. The minimum of the Buffalo market is now represented at $14 for No. 2X, with some makers asking higher levels. It is understood that a considerable portion of iron recently sold in Buffalo territory has been for Canadian shipment. Sales this week in New England territory have reflected the stronger situation in Buffalo and eastern Pennsylvania and have been at advances of from 50 cents to $1 a ton over the lowest prices. New Jersey buyers continue to take on some fair lots of foundry iron. A condenser manufacturer took 1,000 tons of eastern Pennsylvania iron for first half and a zinc company closed for 1,000 tons of the same grade for similar delivery. A pipe interest has taken some tonnage for up-state plants and is out for 1,000 tons for third quarter. Connecticut valve makers are in the market for 500 tons of malleable and from 1,000 to 1,500 tons of foundry iron. A Pittsburg steel interest has had an inquiry in the east for 1,000 tons of low phosphorus. Leading Lehigh and Schuylkill valley makers are holding at from $15 to $15.25, furnace, for No. 2X. Virginia irons are firm at $13, furnace, for No. 2X. The eastern market is quotable at $15, delivered, for first half, at which some recent sales have been closed and for $15.50, delivered, for third quarter. There is some inquiry now pending for third quarter which may be closed today. We quote, prices at New York tidewater, for prompt and first half shipment, as follows:

Northern foundry No. 1	$16 00 to 16 25
No. 2X foundry	15.50 to 15.75
No. 2 plain	15.00 to 15.50
No. 2 Virginia	15.55 to 15.80
No. 2 Southern foundry	15.25 to 15.75
Malleable	15.75 to 16.25
Gray forge	14.25 to 14.50

Ferro-Alloys.—Less is heard of prompt lots of ferro-manganese being offered at very low prices and this market shows a shade of improvement. Sales of the week have reached about 2,000 tons, which were closed at about $37.50, Baltimore, for prompt, and $38, Baltimore, for forward shipment. About 2,000 tons are pending, including 500 to 1,000 tons for a Chicago interest, 500 tons for a Connecticut consumer and scattering inquiry. In 50 per cent ferro-silicon, a Pittsburg steel interest is understood to have taken 300 tons and about 400 tons are pending, including one lot of 300 tons for western shipment. We quote 80 per cent ferro-manganese at from $37.50 to $38, Baltimore, for prompt and forward shipment respectively, and 50 per cent ferro-silicon at from $54.50 to $55.50, Pittsburg.

Cast Iron Pipe.—New business coming out the past week has not been of so large a volume and the market, as a consequence, is quieter. Prices still reflect the aggressive competition of some makers. Brockton, Mass., has bought 2,000 tons, understood to have gone to the leading interest, and the Albany and Pittsfield, Mass., lettings of 500 tons each, are reported to have been placed. Hornell, N. Y., is out for 1,200 tons and bids are going in this week on 350 tons of 48-inch for New York City. The providing of a new water supply for Santiago, Cuba, is expected to provide the requirements for a large tonnage, which, however, is not likely to be out for several months. We quote 6-inch pipe at from $21.50 to $22, f. o. b. New York, in carload lots.

Finished Material.—Structural awards are not heavy, but architects report a very large quantity of work upon the boards. Specifications on old contracts are coming in well. The leading interest is receiving a large tonnage from the Fourth avenue subway construction and for bridge work on the New York, Westchester & Boston railroad now building. The McClintic-Marshall Construction Co. has taken 4,000 tons for the Delaware & Hudson shops, at Watervliet, N. Y. The Baltimore Bridge Co. has 1,200 tons for the Woodward building, Washington. The Virginia Bridge & Iron Works has 1,500 tons of railroad bridges for the Georgia, Coast & Piedmont railroad, placed through J. H. Granbery, 20 Broad street, New York; 400 tons for a bridge in Richmond for the Richmond-Henrico railroad and 500 tons for a highway bridge across the James river below Richmond. The leading interest has 400 tons for an addition to the Emerson hotel, Baltimore, 700 tons for additions to the Altman store, this city, and 140 tons for some small bridges for the Boston & Maine railroad. Bids are going in this week for 500 tons for Jersey Central pier sheds, Jersey City. A new hotel at Boston, to require 3,000 tons, is up. Nothing definite has developed on the large projects pending in this city, including the Woolworth building, the McAlpin hotel, the Pennsylvania station post office and the New York tele-

phone exchange, which will require 40,000 to 50,000 tons.

We quote, New York delivery, as follows: Angles, 3 to 6 inches x ¼ inch and heavier, 1.56c to 1.61c; beams, 3 to 15 inches, 1.56c to 1.61c; tees, 3 x ¼ inch and heavier, 1.56c to 1.61c; plates, carload, tank, 1.56c to 1.61c; boiler steel, 1.66c to 1.71c; marine boiler, 1.96c to 2.01c; bar iron, 1.37c to 1.42c; soft steel bars, 1.56c to 1.61c.

Rails and Track Material.—The Harriman lines have begun negotiations for their year's rail requirements, estimated at about 100,000 tons, and when awards are made this may be increased to 150,000 tons. The Atlantic Coast Line has bought 10,000 to 12,000 tons, of which 1,500 tons went to the leading interest and the remainder to eastern mills. Final details remain to be closed on the 5,500 tons for the New York, Westchester & Boston, which will be rolled by eastern mills. Street and interurban lines are buying more freely. There is pending 1,000 tons for Milwaukee, 1,500 tons for Montreal, 3,000 tons for the Transit Development Co., of Brooklyn, and other lots. The Grand Trunk tonnage, 7,500, is still pending. Manufacturers have booked unusually large orders for tie plates just placed by standard lines apart from recent rail purchases. Some good lots of angle bars are also being taken.

Old Material.—Eastern Pennsylvania steel makers have contracted for probably 15,000 to 20,000 tons of heavy melting steel during the past ten days or two weeks, paying on some lots higher than $15, delivered. This buying has been confined chiefly to two mills and, as other leading consumers have not actively followed their lead, the market is quieter this week. The dealers who have been selling the mills have been covering upon these contracts and some round lots have been taken by these interests. The rolling mills have been more active in the market and have been placing some orders for such material and most grades have advanced from 50 cents to $1 a ton under this influence. The market as a whole seems to have subsided somewhat after the recent flurry. We quote gross tons, prices New York dealers will pay at tidewater, with the exception of cast scrap, which has a local demand, as follows:

Old car wheels	$12.00 to 12.50
Old iron axles	22 50 to 23.00
Old steel shafting	16.00 to 16.50
Heavy melting steel	12.00 to 12 50
No. 1 R. R. wrought	14 50 to 15.00
Iron track scrap	12 50 to 13.00
Wrought pipe	11.00 to 11 50
Cast borings	7.25 to 7 75
Wrought turnings	7.50 to 8.00
Heavy cast scrap	12.00 to 12.50
Railroad, malleable	12.00 to 12.50
Stove plate	9.50 to 10.00
Grate bars	9.50 to 10.00

BIRMINGHAM

Pig Iron Stronger—Shipments from Furnaces Heavier.

Birmingham, Ala., Feb. 27.

Pig Iron.—In all quarters of the trade, this market has a decidedly stronger appearance than even at the time of last report. Melters generally are more disposed to anticipate their requirements and the actual consumption can have but increased materially, owing to the heavy rate of shipments from furnace yards during the past fortnight. The tonnage that was actually sold during last week was very attractive in the aggregate without any reports whatever to the effect that a concession from an $11 per ton, Birmingham, schedule had been granted. So far as can yet be ascertained, no sales of any consequence have been made for delivery further advanced than the first half. At least three of the producing interests are quoting a basis of $11.50 per ton for such deliveries and those concerns who quote $11 per ton, Birmingham, would only accept shipments prior to July 1 at such figures. Two of the smaller producers adhere to a basis of $11.50 per ton, Birmingham, for any deliveries, and still another remains out of the market rather than put its foundry iron producing furnaces back into blast.

Cast Iron Pipe.—Aside from the fact that recent municipal lettings did not result in as low prices as formerly, the latest developments in this market are not of particular interest. The outlook as a whole is considered very encouraging inasmuch as a ready market is being found for municipal securities and that the offering of such securities is very general, but certain of the manufacturers do not yet see fit to operate their plants. It is understood upon good authority that the stocks of popular sizes have been very materially decreased and that the plants that are in operation are well supplied with orders at prices much more satisfactory than for some months past. We do not note a change in prices and continue to quote water pipe as follows, per net ton f. o. b. cars here, viz.: 4-inch to 6-inch, $20.50; 8-inch to 12-inch, $19.50; over 12-inch, average $18.50, with $1 per ton extra for gas pipe. These prices are probably shaded for large municipal contracts.

H. N. Brinsmade, treasurer of the Port Henry Iron Ore Co., Port Henry, N. Y., has gone to Bermuda for a few days' stay.

San Francisco

Pig Iron Made in Electric Furnace Sold at $25 per Ton.

Feb. 21.

The local market is showing very little change, although there is a tendency toward a good future business. A number of orders for structural and pipe steel are expected to develop within a short time. A few rail orders are noted each week.

Pig Iron.—There is very little change noted in the pig iron market, most stocks being ample with a light inquiry. The foundries are reported running on less than half time with an occasional spurt as orders gather. Five hundred tons of Chinese pig arrived here during the week. The Noble Electric Steel Co. at Heroult is putting its product on the market. One furnace is running with an average output of about 25 tons per day. The company is quoting the iron at $25 f. o. b. San Francisco and is storing all that is not taken at that price. There is an inclination to shade prices on continental, the iron being offered as low as $21.00. We quote:

Heroult Pig	$ 25.00
Chinese	23.00 to 23.50
English	22.00
Southern	21.00 to 21.50
Continental	21.00

Coke.—There is a small steady demand for coke in the market. Receipts are reported ample for all purposes. We quote (ex-ship), German syndicate $10.50; English, $12.00.

Plates.—There is considerable steadiness noted in tank steel, a number of oil tank projects being discussed.

METAL MARKETS

New York.

Feb. 28.

Tin.—The monthly tin statistics compiled by C. Mayer, secretary of the New York metal exchange, were published today. The improvement that has been noticeable in the demand for tin products since Jan. 1, is reflected in the deliveries into domestic consumption during February. The aggregate of shipments for this month is 3,800 tons, compared with 3,200 tons in January, and 3,600 tons for the corresponding month of 1910. The arrivals of tin at Atlantic ports during February will be approximately 4,000 tons, and will increase stocks and tin at landing about 200 tons. This will make domestic supplies about 1,900 tons as of March 1. These surplus stocks are controlled by a few local interests, however, and the average consumer is confronted with

the necessity of paying a premium of from 1c to 1½c per pound over the cost to import for spot tin. There is a good demand for the metal and if the holders would let go at the London spot price a large tonnage could be disposed of. Spot and near-by contracts are held at 43.25c and March at 42.12½c. The London market closed firm today under the influence of the good American deliveries, notwithstanding shipments from the Straits during February exceeded the estimated amount, and also showed an increase over the same period of 1910. The total for Feb., 1911 is 4,290 tons, and for the corresponding month of 1910, 4,147 tons.

Copper.—Consumers have bought the metal liberally around 12½c, delivered 30 days, throughout the month, according to reports made by important selling interests. The trading has been done quietly, but there are sufficient surface indications to justify believing the total of February sales to be the largest monthly aggregate booked for four or five months. Electrolytic is being held firm at 12½c, delivered 30 days, by all leading sellers, and lake at 12.75c. The exports since Feb. 1 are 18,697 tons.

Lead.—The market still appears soft on the surface, but dealers report that best brands when wanted have to be taken at the leading interest's quotation of 4.50c, in New York. Some independents are offering soft lead as low as 4.42½c, in New York.

Spelter. — Another advance of 5 points in the price is noted. Prime western is quoted at 5.60c to 5.70c, in New York, and it requires a good buyer to get away from the outside figure.

Antimony.—It now looks very much like something substantial has been accomplished by the makers of special brands of antimony by way of an agreement. The prices of Cookson's and Hallett's brands have been advanced to 9.50c and 9.25c, respectively. There is practically no demand for the metal at those prices, though. Hungarian is 8.25c.

St. Louis.

Feb. 27.

Lead and Spelter.—Choice lots of zinc blende brought a top price of $45 a ton in the Missouri-Kansas-Oklahoma district last week, on an assay base of $43 for 60 per cent grades, with the base price ranging down to $38. Shipments were unusually heavy, especially in the outlying camps. The market manifested signs of weakness toward the close of the week in the face of the fact that spelter was quoted at 5.50c, Saturday, at East St. Louis. It is believed the spelter market will remain unchanged throughout the present week, although transactions were not brisk today. As a result of a curtailment in production, on account of inclement weather, calamine was in strong demand and slightly better prices were obtained, the base price for 40 per cent grades ranging from $20 to $24 a ton, with highly choice ores bringing $28. Quite a number of calamine mines ceased operations on account of the unfavorable weather conditions. Lead ore was less steady at $55 a ton, while the St. Louis pig lead market closed the week at 4.27½c.

Chicago.

Feb. 28.

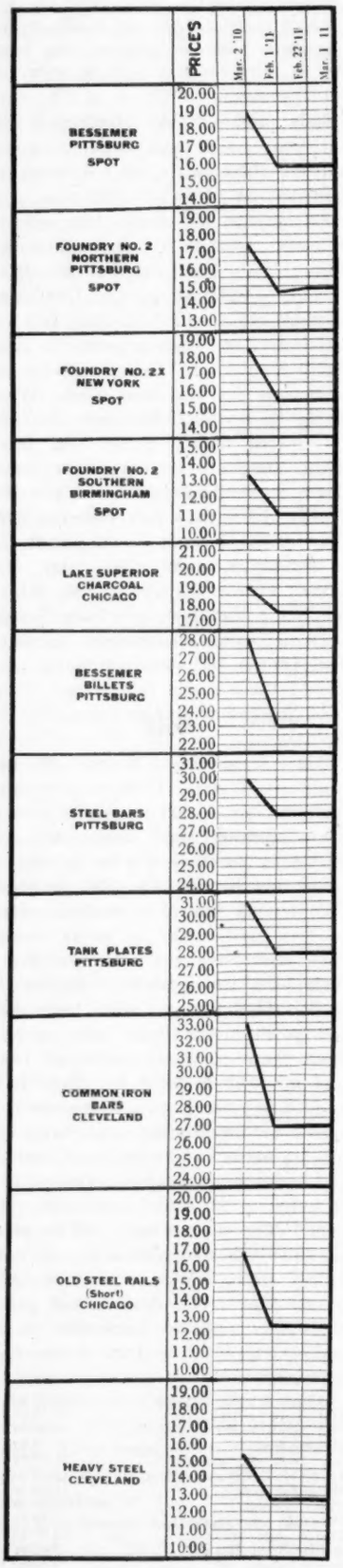
New Metals.—The copper market in the west has not changed perceptibly during the past week. There is considerable buying for immediate needs and the price is steady. Spelter is 5 cents higher than it was a week ago, and the demand is very good in the face of an increase in prices. Lead is quiet and the leading interest is not having much difficulty in maintaining its prices. Tin has weakened during the week and is now quoted 44½c, Chicago, a decline of 1 cent. This has encouraged consumers to enter the market a little more freely.

We quote, dealers' selling prices f. o. b. Chicago, as follows: Lake copper, carload lots, 12⅞c; casting, 12¾c; smaller lots, 1¼c to ⅜c higher. Spelter, car lots, 5.55c to 5.60c; lead, desilverized, 4.45c, in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.50 list, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 44½c, Cookson's antimony, 10c; other grades, 9c to 10c.

Old Metals.—Some fair business in old copper was done during the week and to a limited extent purchasers are showing more interest in their future requirements. Price changes have been only fractional and stocks of material in the hands of dealers and other selling interests are comparatively large.

We quote, dealers' selling prices, f. o. b. Chicago, as follows: Copper wire, 12½c; heavy copper, 12¼c; light copper, 11¼c; heavy red brass, 11c; heavy yellow brass, 9c; light brass, 7c; No. 1 red brass borings, 9½c; No. 1 yellow brass borings, 7½c; brass clippings, 8½c; tea lead, 3.80c; lead scrap, 4¼c; zinc, 4.60c; tin pipe, 39c; tin foil, 36c; pewter, 27c; electrotype plates, free from wood, 4c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3¼c; linotype dross, 3¼c; prime slab zinc dross, $75 per ton.

PRICE CHART



LACKAWANNA STEEL

Makes Excellent Showing in Report For Year 1910.

The full pamphlet report of the Lackawanna Steel Co. and subsidiary companies for the year ending Dec. 31, 1910, has just been made public. In his remarks, transmitting the figures, President E. A. S. Clarke says:

In the report sent you under date of Mar. 9, 1910, it was stated that prices for company's products for the year 1910 to that date were higher than those of 1909, and that the outlook for business during the year 1910 was favorable. A little later in the year, there appeared indications that steel production was in excess of demand and prices began to decline, so that at the close of 1910 they were, in many lines, from $3 to $4 a ton lower than at the beginning of the year. Sales diminished after the middle of the year, and during the last quarter particularly were much reduced. Notwithstanding this, the shipments of your company's products, as shown below, are the largest of any year. The average price of $28.92 per gross ton, received by your company for its products in 1910, is $1.25 per ton greater than the corresponding price of 1909, and the year shows a surplus earned over all charges and deductions, including liberal allowances for depreciation, of $2,533,104.71, equivalent to about 7.25 per cent on your company's outstanding capital stock. Compared with the results of the year 1907, which were the best in your company's previous operations, the shipments show an increase of 90,815 tons, or 9.15 per cent, and the earnings show an increase of $89,258.55, or 3.65 per cent, notwithstanding the fact that the average prices of 1910 were $4.36 per gross ton, or 13.10 per cent less than those of 1907.

Your company received during 1910 from mines which it owns, or is interested in, and from other sources, 2,127,992 gross tons of iron ore, and produced a total of 854,054 gross tons of coke and 1,008,796 gross tons of pig iron. It also produced 729,638 gross tons of Bessemer ingots and 419,032 gross tons of open-hearth ingots, a total of 1,148,670 gross tons of steel ingots of all kinds.

Shipments of products were as follows, all in gross tons, the figures for the year 1909 being given for comparison:

	1910.	1909.
Standard rails	363,577	278,885
Light rails	26,288	33,787
Angle bars, fittings, etc.	60,071	43,901
Structural shapes	146,641	138,021
Plates	87,469	60,953
Merchant steel products	67,150	41,607
Sheet bars, slabs, billets	159,761	201,455
Pig iron and misc.	171,558	115,044
Total	1,082,515	913,653

Your properties have, during the past year, been maintained in high physical condition. Your company's open-hearth steel producing capacity was increased about 10 per cent during the year by the construction of one 60-ton open-hearth furnace. Following their established policy of greater diversification of your company's products, your directors have, during the past year, authorized the construction of an additional merchant bar mill, with an estimated annual capacity of 100,000 tons, which is nearing completion.

During the year, $750,000 of Ellsworth Collieries Co. purchase money notes, being the entire outstanding amount, were paid and $422,000, face value, of bonds of subsidiary companies were also redeemed and cancelled.

The profit and loss account was as follows:

Gross earnings		$31,302,759.95
Operating expenses		24,972,289.48
Total net income		$ 6,330,470.47
Net income from rents, etc.		940,062.18
Discount and interest		45,996.79
Total income		$ 7,316,529.44
Deduct:		
General expenses	$754,713.60	
State tax	119,467.65	
		874,181.25
Net earnings		$ 6,442,348.19

EXPORT DEMAND

Calls for Steel Rails, Cars and Other Products.

The United States Steel Corporation is now running 65 per cent of its blast furnace capacity and 70 per cent of finishing mills. The Tennessee Coal, Iron & Railroad Co. will blow in a furnace Monday.

Export business continues active. The Pan American Uruguayan Transcontinental railroad is in the market for 45,000 rails, but is expected to buy but only a small lot. This line has placed an order for freight cars with the Standard Steel Car Co., and for passenger cars with Harlan & Hollingsworth. Brazil has placed 2,000 tons of rails with the leading interest, and there is good inquiry for different materials from Japan. The Grand Trunk, which has been out for 61,000 tons for Canadian shipment, has placed some of this tonnage with the Dominion Iron & Steel Co.

Round lots are still being offered by buyers in Canada. The Algoma Steel Co.'s rail mills are understood to be sold up for a good part of the year.

Basic and Bessemer Averages

Pittsburg, Mar. 1. (By wire.)

The monthly average price of basic pig iron for February is given as $13.603, valley, or $14.503, Pittsburg, compared with $13.291, valley, or $14.191, Pittsburg, in January. The average price of Bessemer for February was $15, valley, or $15.90, Pittsburg, the same as for the preceding five months. Stocks of basic in the hands of middlemen have been materially reduced and $13.75, valley, is regarded as a minimum.

Silvery Sale

St. Louis, Mar. 1. (By wire.)

Fifteen hundred tons of high silicon silvery pig iron sold to local stove manufacturer today for future shipment.

DUPLEX METHOD

Of Steel Making Begun by Bethlehem Bessemer Plant Completed.

Steel making by the duplex process was inaugurated the past week by the Bethlehem Steel Co., South Bethlehem, Pa., upon the completion of the new Bessemer plant and auxiliary equipment which has been under construction for the past year or more. The plant consists of two 20-ton Bessemer converters and a 400-ton metal mixer. The hot metal from the blast furnaces is partially desiliconized and decarborized in the Bessemer converters and is then put through the open-hearth furnaces, which have been a part of the Bethlehem equipment for many years. The Saucon plant of 10 furnaces, which was an extension of the open-hearth capacity, is comparatively new, having only been completed in August, 1907. Finishing touches are now being laid upon one of the new blast furnaces under construction at South Bethlehem, and it is expected that the air will be applied to this stack in a few weeks. Another furnace now undergoing construction, will be ready for blowing some time in the summer. The adoption of the duplex method by the Bethlehem Steel Co. makes it the second leading steel interest of the east to include this method in its practice. The Pennsylvania Steel Co. and its associated interest, the Maryland Steel Co. have been using this process at Steelton and Sparrow's Point for several years.

Late Rail Sales

New York, Mar. 1. (By wire.)

The Wichita & Midland Valley has placed 7,600 tons of steel rails with the Illinois Steel Co., which also reports 3,000 tons scattering. The Carnegie Steel Co. has 10,000 from the Cleveland, Akron & Columbus. The Oakland Construction Co. placed 1,000 tons with the Pennsylvania Steel Co.

Eastern consumers are showing a greater disposition to contract, especially for bars and shapes. Some good sized orders have been placed for first half and others are pending. Makers are not anxious to sell beyond first half.

Pipe Coupling Contract

Pittsburg, Mar. 1. (By wire.)

The Dayton Pipe Coupling Co. has been awarded the contract for the pipe coupling for the 50-mile pipe line, to be laid in northern Pennsylvania for the Tri County Natural Gas Co. This is one of the largest orders of its kind placed in this market in several months.

Record Breaking Year of Iron Ore Shipments

Rail Shipments, However, Show Decrease Steel Corporation's Share Not Quite So Large — Poor Showing Made by Menominee Range

The remarkable record made by the Lake Superior mining districts last year, in spite of the discouraging conditions that prevailed during a considerable part of the period, is shown by the complete returns from all the iron mines, giving the ore shipments for the season, with comparisons for previous years, presented in the supplement to this issue. The total includes the mines of the Mayville district of Wisconsin, and shows that there were forwarded by lake and all-rail, 43,442,397 tons. This total does not include 115,790 tons from the Helen mine, shipped from Michipicoten harbor by the Lake Superior Corporation, and 72,470 tons from Moose Mountain mine, shipped from Key Harbor by Oglebay, Norton & Co.

Thus a new record was established, the total being greater than the shipments for 1909, the previous record year, by 855,528 tons. Shipments for 1909 exceeded those for 1907, then the record year, by 320,201 tons. Lake shipments exceeded those of 1909 by 945,159 tons, but the rail shipments were 89,631 tons less. Shipments for both 1909 and 1910 were, of course, much greater than those for 1908, when the depression in business caused a falling off in shipments for that year to 26,014,987 tons. The Marquette range reached its highest total, with 4,392,726 tons, exceeding 1909 by 136,554 tons. The great Mesabi makes another record, shipping 29,201,760 tons, which was 1,025,479 tons more than in 1909, which was a record year. The Gogebic also broke all previous records, the total, 4,315,314, exceeding that of 1909 by 227,257 tons. The Menominee range did not exceed the record of 1909, being 637,637 tons behind, with a total of 4,237,738 tons, which is the smallest for this range, with the exception of 1908, since 1904. The Vermillion range shipped 94,962 tons more than in 1909, but did not reach the tonnages of earlier years.

The United States Steel Corporation percentage was 49.86 per cent, five-tenths of 1 per cent less than last year. In other years, the Corporation has sent out as much as 56 per cent of all the ranges.

Nine mines shipped more than a million tons, the same number as in 1909, but there are a few changes: The mines in this class are Adams, Burt,

Shipments by Mines.

MESABI RANGE.

Adams	1,258,295	Leonard	987,910
Adriatic	155,685	Lincoln	318,912
Agnew	152,634	Mace	13,267
Albany	267,583	Maderia	83,922
Alberta	25,404	Mahoning	1,515,723
Alexander	1,632	Malta	72,035
Bangor	17,673	Mariska	23,265
Bessemer	117,173	Meadow	4,392
Biwabik	544,353	Miller	216,263
Bay	57,789	Minnewas	963
Brunt	110,630	Minorca	66,511
Burt	1,032,815	Missabi Mountain	7,226
Canisteo	1,105,160	Mississippi	36,581
Chisholm	634,236	Mohawk	123,180
Clark	529,222	Monica	69,503
Commodore	341,548	Morris	1,364,673
Corsica	277,537	Myers	131,440
Crosby	159,569	Nassau	39
Croxton	71,632	Onandaga	61,935
Cyprus	102,233	Pearce	60,411
Duluth	57,239	Pearson	78,133
Elba	186,993	Perkins	80,622
Elizabeth	7,214	Pettit	62,456
Euclid	53,009	Roberts	26,915
Fayal	1,485,099	Sauntry-Alpena	242,373
Forest	8,264	Sellers	954,042
Fowler	204,640	Seville	2,677
Franklin	31,614	Schley	13,369
Genoa	283,299	Shenango	965,148
Gilbert	110,788	Silverton	13,740
Glen	286,051	Sliver	358,432
Grant	297,761	Spring	31,909
Hanna	308,009	Spruce (Cloquet)	613,947
Harold	27,711	Stevenson	953,079
Hartley	113,512	Susquehanna	176,869
Hawkins	224,406	Sweeney	769
Hector (Hale)	82,393	Syracuse	2,363
Higgins No. 2	151,854	Troy	104,057
Hill	801,088	Uno	341,939
Holman	413,873	Utica	232,582
Hudson	168,553	Victoria	27,592
Hull-Rust	3,189,975	Virginia (Group)	985,163
Humphrey	8,227	Virginia (P., M. & Co.)	299,046
Iroquois	231,842	Wacootah	35,498
Jordan	20,314	Webb	46,384
Kellog	142,906	Wills	26,712
Kinney	401,920	Winnifred (Day)	67,686
Knox	50,942	Yawkey	30,439
LaBelle	20,349		
Larkin (Tesora)	21,700		
LaRue	128,658		
Laura	189,046		
Leetonia	615,396		
Total			29,201,760

MENOMINEE RANGE.

Antoine (Clifford)	91,081	Great Western	80,709
Aragon	241,046	Groveland	26,462
Armenia	65,473	Hemlock	115,407
Baker	39,417	Hiawatha	128,884
Baltic	171,930	Hollister	49,434
Berkshire	97,999	James	78,388
Bristol (Claire)	270,742	Lamont (Monitor)	3,183
Caspian	171,334	Loretto	116,048
Chapin (Ludington)	465,543	Mansfield	114,357
Chatham	51,988	McDonald	6,022
Commonwealth	89,116	Michigan	17,922
Dober (Riverton)	84,269	Munro	20,022
Dunn	136,144	Penn Iron M'ng. Co.	344,760
Florence	239,161	Pewabic	380,376
Fogarty	51,071	Quinnesec	744
Genesee (Ethel)	66,185	Tobin	235,812
Gibson	45,202	Tully	2,726
		Vivian	14,827
		Youngs	98,399
		Zimmerman	25,555
Total			4,237,738

GOGEBIC RANGE.

Anvil	7,235	Montreal	187,325
Ashland	231,506	Newport	1,182,324
Atlantic	79,847	Norrie Group	1,333,006
Brotherton	102,626	Ottawa (Odanah)	83,389
Cary (and Superior	205,674	Pence	8,954
Castile	20,197	Pike	3,324
Colby	194,754	Puritan (Ruby)	50,019
Eureka	41,611	Sunday Lake	115,486
Harmony (Germania)	20,080	Tilden	99,937
Iron Belt	66,627	Winona	10,500
Ironton	109,925	Yale (West Colby)	108,253
Mikado	52,715		
Total			4,315,314

MARQUETTE RANGE.

American (Sterling)	163,290	Lucy (McComber)	11,257
Austin	188,588	Maas	208,103
Beaufort (Ohio)	23,427	Mary Charlotte	197,522
Breitung Hematite	114,202	Mitchell	23,428
Cambria	150,422	Negaunee	348,818
Champion	18,746	Portland	49,584
Cleve'd-Cliffs Group	955,374	Princeton (Sw'nz'y)	89,441
Empire	53,687	Queen (Blue)	230,119
Hartford	183,471	Republic	150,732
Imperial	83,404	Richmond	95,772
Jackson	40,320	Rolling Mill	115,193
Lake Angeline	244,923	Stegmiller	48,842
Lake Superior	271,445	Stephenson	228,726
Lillie	10,121	Washington	96,769
Total			4,392,726

VERMILLION RANGE.

Pioneer	526,435	Soudan (Minn.)	75,511
Savoy	59,875	Zenith	283,320
Section 30	51,650		
Sibley	206,386		
Total			1,203,177

MISCELLANEOUS.
(In Wisconsin.)

Iron Ridge	14,487	Mayville	77,195
Total			91,682
Grand total			43,442,397

SHIPMENTS BY RANGES, GROSS TONS.

	1910	1909	1908	1907	1906	1905
Marquette range	4,392,726	4,256,172	2,414,632	4,388,073	4,057,187	4,215,572
Menominee range	4,237,738	4,875,385	2,679,156	4,964,728	5,109,088	4,495,451
Gogebic range	4,315,314	4,088,057	2,699,856	3,637,102	3,643,514	3,705,207
Vermillion range	1,203,177	1,108,215	841,544	1,685,267	1,792,355	1,677,186
Mesabi range	29,201,760	28,176,281	17,257,350	27,495,708	23,819,029	20,158,699
Miscellaneous	91,682	82,759	122,449	95,790	144,589	132,001
Total	43,442,397	42,586,869	26,014,987	42,266,668	38,565,762	34,384,116

SHIPMENTS BY PORTS AND ALL-RAIL, GROSS TONS.

	1910	1909	1908	1907	1906	1905
Escanaba	4,959,726	5,747,801	3,351,502	5,761,988	5,851,050	5,307,938
Marquette	3,248,516	2,909,451	1,487,487	3,013,826	2,791,033	2,977,828
Ashland	4,094,374	3,834,207	2,513,670	3,436,867	3,388,106	3,485,344
Two Harbors	8,271,177	9,181,132	5,702,237	8,188,906	8,180,125	7,779,850
Superior	8,414,799	6,540,505	3,564,030	7,440,386	6,083,057	5,118,385
Duluth	13,640,166	13,470,503	8,808,168	13,448,736	11,220,218	8,807,559
Total by lake	42,628,758	41,683,599	25,427,094	41,288,755	37,513,589	33,475,904
Total by rail	813,639	903,270	587,893	975,959	1,052,173	907,212
Total	43,442,397	42,586,869	26,014,987	42,266,668	38,565,762	34,384,116

Canisteo, Fayal, Hull-Rust, Mahoning, Morris, on the Mesabi, and Newport, and Norrie group on the Gogebic. The Norrie group and Canisteo for the first time appeared in the million-ton list, although Norrie was formerly among the largest mines. Canisteo is one of the Steel Corporation's washed ore properties, and will probably be a coming record breaker. The past year was the first year it had been working to any considerable extent. The famous Stevenson, of Corrigan, McKinney & Co., and the Virginia group, dropped out of the million ton list last year, 1910 being the first year, with the exception of 1908, since 1901 in which the Stevenson has failed to reach the million mark. Hull-Rust leads, as usual, with 3,189,975 tons, more than double that of the Mahoning, its nearest rival.

New properties are the Winona, on the Gogebic; Tully, on the Menominee; Section 30 on the Vermillion; and Bangor, Elizabeth, Harold, Hill-Hudson, Humphrey, Madeira, Meadow, Missabe Mountain, Mississippi, Schley, Silverton, Uno and Virginia on the Mesabi range. There are now two Virginias, the older being a property of the Oliver Iron Mining Co., and the new producer the property of Pickands, Mather & Co.

Coating Black Plate With Aluminum

There is a good deal of curiosity expressed in trade circles regarding a new process which is about to be worked in Germany for coating blackplate on one side only with aluminum, the idea being that this substance shall take the place of tin plate for dry packing. Works for producing these plates are, it is understood, being in course of construction, and contracts for the necessary raw materials required for a long time to come, have, it is said, been closed. The finished plate will, it is said, be much cheaper than ordinary tin plate, while the material can be printed upon and used in exactly the same way as can tin plate.—The Ironmonger, London.

St. Louis Shipments

Receipts and shipments of pig lead and spelter at St. Louis for the last two weeks were as follows:

	Zinc and spelter.	Pigs of lead.
Receipts:—		
For week ending Feb. 18.....	87,640	51,120
For week ending Feb. 25.....	86,580	42,420
Shipments:—		
For week ending Feb. 18	95,380	19,360
For week ending Feb. 25.....	103,110	23,370

PRESIDENT CHOSEN

For Recently Organized Pittsburg Crucible Steel Co.

W. C. Fownes, of Pittsburg, has been elected president, and John W. Dougherty, formerly vice president and general manager of the Pennsylvania Steel Co., has been elected vice president and general manager of the newly organized Crucible Steel Co., which will build and operate a large steel plant at Midland, Pa., on property recently purchased from the Midland Steel Co. Mr. Fownes was formerly identified with the Midland Steel Co. Mr. Dougherty is recognized as an able operating man and is well known in steel-making circles. Other appointments will be announced later.

The Pittsburg Crucible Steel Co., on Mar. 1, took over the Midland properties and is expected to begin actual construction of new works in the very near future. In addition to the plans announced recently, which include a new blast furnace, eight open-hearth steel furnaces, an electric furnace, finishing mills, etc., it is announced that the company will build a large agricultural shape plant.

Will Consolidate and Improve Plants

Articles of incorporation have been issued to the Ahrens Iron Works Co., Cincinnati, to manufacture and deal in architectural, structural and ornamental iron. The capital stock is placed at $100,000, and these incorporators are named: A. E. Otte Jr., G. F. Ahrens, L. Durbrow Jr., Robert Puff and Otto Loesche. The new company will take over the business of the Union Iron Works, at Colerain avenue and Sassafras street, Cincinnati, and will consolidate with the Stewart and Walton Iron Works Co. Extensions and improvements will be made to the plant. The president of the new company will be G. F. Ahrens, formerly president of the Ahrens Fire Engine Co.

Steel Casting Concern

The Keystone Steel Casting Co., Pittsburg, has filed articles of incorporation at Dover, Del., the capital stock being placed at $700,000. The incorporators named are all Pittsburg men, John Sauers, John P. Conn, John Weikersacher, Theodore Beihl and Charles Beihl.

The Thomas Walters.—The bulk freighter building for the Jones & Laughlin Steel Co. at the Lorain yard of the American Ship Building Co., will be named in honor of Thomas Walters, of Ishpeming, Mich., who is the mining expert for the steel company.

CONTRACT AWARDED

For Big Oliver Building—Larger Scotia Ore Output.

Toronto, Can., Feb. 28.

The Oliver Chilled Plow Works, Hamilton, Ont., has awarded the contract for the erection of its assembling building, amounting to $200,000 for the bulk contract, to H. C. Christman & Co., South Bend, Ind. The Hamilton Bridge Works Co. has the contract for the structural steel required.

H. C. Vautelet has resigned as a member of the Quebec Bridge Commission, the reason assigned being ill health.

R. C. Chambers, manager of the ore mines of the Nova Scotia Steel & Coal Co., states that last year all previous ore mining records of the company were surpassed, over half a million tons being produced. The addition of the new submarine mine to the other producers at Wabana, Bell Island, should considerably increase that figure this year. The submarine slopes have been driven about 2,500 feet into the Scotia's areas, levels are being run off them and the mine is being equipped to handle a heavy tonnage.

Capital Increased

At a meeting of the National Acme Mfg. Co., Cleveland, Feb. 24, it was decided to increase the capital stock from $1,500,000 to $2,500,000. The increase is for the purpose of meeting the expenses entailed in establishing the company's new Montreal, Can., plant. The latter is being operated under a Canadian license, as a branch of the Cleveland plant.

The Prescott Malleable Iron Co., West Milwaukee, has been incorporated with $100,000 capital stock, by F. M. Prescott, C. S. Prescott and Fordyce H. Bottum. The company has taken over a malleable iron concern built at West Milwaukee, but never placed in operation.

The National Screw & Tack Co., Cleveland, has been authorized by stockholders to increase the capital stock from $1,000,000 to $1,250,000, of which $250,000 will be distributed as a stock dividend.

Personal

Chairman E. H. Gary, of the United States Steel Corporation, has returned after a month's sojourn in Florida.

John S. Oursler, manager of the Sharon and New Castle, Pa., plants of the Carnegie Steel Co., has returned from a six weeks' trip to Europe.

W. C. Frownes Jr., Pittsburg, has been elected to the board of directors of the Crucible Steel Co. of America, to succeed Reuben Miller, who retired some time ago.

Edgar S. Cook, president of the Warwick Iron & Steel Co., Pottstown, Pa., has sailed for a several months' tour of points of interest in southern Europe.

R. L. Sites is in charge as manager of the New York office which the Wm. J. Oliver Mfg. Co., manufacturer of mining and contractors' equipment, has opened at 50 Church street.

Edward T. Adams, formerly manager of the gas engine department of Allis-Chalmers Co., Milwaukee, has been elected president of the Wisconsin Engine Co., of Corliss, Wis.

G. W. Douglas, formerly a salesman in the pig iron department of Rogers, Brown & Co., has accepted a position as salesman in the pig iron department of J. K. Dimmick & Co., Philadelphia.

J. H. Ward was elected a director of the Chicago Pneumatic Tool Co., succeeding John W. Duntley, at the annual meeting. The other retiring directors and officers were re-elected.

B. F. Fackenthal Jr., president of the Thomas Iron Co., and W. S. Pilling, of Pilling & Crane, Philadelphia, have gone on a month's trip through far western plants, especially California.

S. C. Ludwig, formery with the Alan Wood Iron & Steel Co., is now associated with the Philadelphia office of Matthew Addy & Co., giving especial attention to the selling of merchant steel.

Ebenezer Francis, superintendent of the steel foundry at the Pennsylvania Steel Co.'s works at Steelton, Pa., has resigned, effective March 1, to accept a similar position with a foundry at Newark, N. J.

Stephen Heckscher has been elected director of the Pottstown Iron Co., Pottstown, Pa., to take the place made vacant by the death of his brother, Austin Heckscher. The other directors have been re-elected.

John I. Beggs, president and general manager of the Milwaukee Electric Railway & Light Co. and of the Milwaukee Light, Heat & Traction Co., has resigned, effective April 1, to become president and general manager of the St. Louis Car Co., St. Louis.

S. G. Harrison, of the London office of Sata & Aznar, Spanish ore merchants, who has been in this country negotiating contracts for their ore with eastern furnaces for this season's shipment, sailed for home the past week.

Thomas C. Clarke, formerly general superintendent of the Lackawanna Iron & Steel Co., and for the past three years in charge of the steel sheet piling department of the Lackawanna Steel Co., has resigned in order to accept a position with the Lehigh Coke Co., which is about to build a large plant at South Bethlehem, Pa.

Percival Roberts Jr., of Philadelphia, a director of the United States Steel Corporation, has been elected a member of the finance committee to succeed W. E. Corey. Mr. Roberts was first chosen a director and member of the executive committee of the Corporation in 1902, but resigned the following year because of ill health, being re-elected in 1909.

Obituary

Emile Maertens, the inventor of many machines used in the textile industry, died Feb. 26, at Providence, R. I., aged 59.

Frank Rutan, of Pittsburg, a member of the firm of Rutan & Russell and one of the best known architects in western Pennsylvania, died Feb. 26, at Atlantic City, N. J., after an illness of 18 months.

Louis Arnold, a pioneer foundryman, died at Lexington, Ky., aged 69. He established the Washington foundry in Louisville and manufactured equipment for steamboats. After disposing of his interests in that he was connected with the Snead Architectural Iron Works, of Louisville, for several years.

Daniel Connelly, a prominent builder of boilers in Cleveland for many years, died in that city, Feb. 26, after some months of illness, aged 67. Thirty-six years ago he founded the Cleveland Steam Boiler Co., of which he remained executive head until three years ago, when, with his sons, William C. and Lawrence, he formed the D. Connelly Boiler Co., himself remaining president. The company had just completed a modern boiler-making plant in East Cleveland.

Harry Strong Taylor, one of the best known Detroit business men, died unexpectedly in that city, Feb. 23, of apoplexy. He had been in his usual health and his sudden passing was a shock to both family and friends. He was vice president of the Michigan Malleable Iron Co., and was interested financially in the Detroit Stoker Co., Monarch Steel Castings Co., Detroit Motor Castings Co., Detroit Foundry Co., and the Chalmers Motor Co. He was a member of several clubs, the chamber of commerce and one of the founders of the Ohio society. Mr. Taylor was born at West Liberty, O., on Jan. 18, 1857, and after being graduated from Wooster university engaged in mercantile pursuits. He then entered the banking business in his native town, but about 20 years ago went to Detroit. First engaging in the manufacture of cigars, he later became a member of a company manufacturing women's wear. Retiring from that business several years ago he gave up active business.

Frank S. Layng, a director and formerly vice-president of the Railway Steel Spring Co., New York, died Feb. 11. Mr. Layng had devoted practically his entire business life to the steel spring industry. He was born in Steubenville, O., in 1854 and started in the steel spring business with the A. French Spring Co., Pittsburg, in 1883. He obtained an interest in this company and was made superintendent. In 1886 he resigned, although retaining his interest, and went to the Pickering Spring Co., Philadelphia, acquiring an interest in that company and being made secretary and treasurer. Later he obtained complete control and served as chairman of the board until the property was bought by the Railway Steel Spring Co. in 1902. On the organization of the Railway Steel Spring Co., Mr. Layng was made a director and vice president in charge of operations. He resigned as vice president in 1903 to look after his own interests, retaining his directorship. Mr. Layng was also a director of the Illinois Zinc Co., Peru, Ill., at the time of his death.

E. E. Williams and H. C. Duncan, both of Huntington, W. Va., have been appointed receivers for the Independent Steel Co., with a plant at Kenova, W. Va.

The Tennessee Coal, Iron & Railroad Co. has blown in an additional furnace at its Ensley, Ala., plant, making a total of three stacks in operation at that plant.

The last active stack of the Wharton furnaces. Wharton, N. J., was blown out Feb. 7.

IRON AND STEEL SECURITIES

The event of overshadowing importance for the week was, of course, the decision of the interstate commerce commission against the proposed advance of railroad freight rates. Opinion is still divided as to what the ultimate result of this decision will be.

The market on Monday opened dull, but when no supreme court decisions were handed down, prices rallied and closed firm; wheat was weak and lower, because of favorable winter wheat conditions. Tuesday, the general list was heavy, moving within a narrow range of quotations; the cotton market again declined sharply. Wednesday was a holiday in America, being Washington's birthday anniversary. Thursday, the interstate commerce decision was not handed down until an hour after the close of the market, but in expectation of the decision the share market ruled dull and the undertone was firm; wheat declined to the lowest price on the crop, and there was a break in coffee. Friday, stocks opened 2 to 7 points lower; in the first hour 460,000 shares changed hands, the market at first being lower, but finally recovering about half the actual loss and closing firm; the grain markets were again weak; London was a seller of American securities. Saturday's market was extremely dull, and closed near the lowest price, but with small net changes; wheat and corn again declined.

Call money ranged from 2⅜ to 1¾ during the week, and time money was quiet. Actual figures of clearing house banks showed loans increased $7,853,600, deposits increased $12,390,700, reserve increased $4,734,300, surplus increased $1,647,250, bringing the total surplus up to $41,700,950, and the percentage of reserve, 28.04, compared with 27.95 the week previous. Nonmember banks and trust companies showed loans increased $1,604,700, net deposits increased $2,868,600, reserve on deposits increased $254,400, and the percentage of reserve 17.4, unchanged.

The fortnighty railway bulletin placed the surplus of idle cars at 173,667, compared with 155,068 two weeks ago, an increase in the idle cars of 11.9 per cent, the present surplus being three times as much as a year ago, the greatest difference being in coal cars. Commercial failures for the week were 263, compared with 252 the preceding week, and 221 the corresponding week last year. Bank clearings were the smallest of the present year to date, declining 8 per cent, compared with last year, and 4 per cent with a year ago. Shares were sold to the number of 2,178,900, compared with 2,155,550 the preceding week, and 2,139,400 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $13,386,000, compared with $13,098,000 the preceding week, and $11,770,000 the corresponding week last year.

	Closing Quo. Feb. 25	Changes in week	Annual Meeting date 1911	Stock Outstanding	Basis	Dividend: Last Dividend	Dividend: Date Last Div. Pay.
Allis-Chalmers	7⅞	.....		$19,820,000		.....	.....
Allis-Chalmers, pr	31	—1	Nov. 2	16,150,000	7 cum.	1¾ Q.	Feb., 1904
American Can	9⅝	+ ⅜	Feb. 1	41,233,300		1¾ Q.	.....
American Can, pr	80¾	— ½		41,233,300	7 cum.	1¾ Q.	Jan., 1911
Am. Car & Fdy	54	—2¼	June 29	30,000,000		½ Q.	Jan., 1911
Am. Car & Fdy., pr	118½	.....		30,000,000	n. c.	1¾ Q.	Jan., 1911
American Loc	37½	—3¾	Oct. 17	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr	109¾	— ¼		25,000,000	7 cum.	1¾ Q.	Jan., 1911
American Ship	77	— ¼	Oct. 11	7,600,000	4	1 Q.	Sept., 1910
American Ship, pr	111⅝	.....		7,900,000	7 cum.	1¾ Q.	Jan., 1911
Am. Steel Foundries	47½	—2	Dec. 7	17,184,000		1¾ Q.	Feb., 1911
Barney & Smith	20	.....	June 6	2,000,000	4	1 Q.	Dec., 1907
Barney & Smith, pr	90	.....		2,500,000	8 cum.	2 Q.	Mar., 1911
Bethlehem Steel	31	—1¾	April 4	14,862,000		.....	.....
Bethlehem Steel, pr	61¼	—2¼		14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	46⅜	—1⅜	Mar. 21	45,000,000	5	1¼ Q.	Feb., 1911
Cambria Iron	45½	.....		8,468,000*	4	2 S. A.	Oct., 1910
Chicago Pneumatic Tool	54	+3½	Feb. 20	6,485,800	4	1 Q.	Jan., 1911
Colorado Fuel	33¾	.....	Oct. 16	34,235,500		1¾ Q.	Apr., 1902
Crucible Steel	14½	+1	Oct. 18	24,578,400		3½.	.....
Crucible Steel, pr	81½	— ¼		24,463,500	7 cum.	1¾ Q.	Mar., 1911
Empire Steel	5	.....	Feb. 22	1,254,770		.....	.....
Empire Steel, pr	55	.....		2,500,000	6 cum.	2 S. A.	Jan., 1911
Fay & Egan	70	.....	Feb. 21	1,000,000	6 cum.	3 S. A.	Feb., 1909
Fay & Egan, pr	110	.....		1,000,000	7 cum.	1¾ Q.	Feb., 1911
General Electric	152½	—1	May 9	65,179,600	8	2 Q.	Apr., 1911
Harbison-Walker	40½	.....	Jan. 16	18,000,000		½ Q.	Mar., 1911
Harbison-Walker, pr	95	.....		9,600,000	6 cum.	1½.	Jan., 1911
International Pump	40¾	—2¾	Dec. 12	17,762,500		1 Q.	Nov., 1910
International Pump, pr	87½	— ½		11,350,000	6 cum.	1½ Q.	Feb., 1911
Lackawanna Steel	38	.....	Mar. 8	34,978,000		.....	.....
Lake Sup. Corp	30¼	+ ¼	Oct. 4	40,000,000		.....	.....
New York Air Brake	72	.....	Mar. 8	10,000,000	8	1½ Q.	Jan., 1911
Niles-Bement-Pond	94	.....	Feb. 8	8,500,000	6	1½ Q.	Mar., 1911
Niles-Bement-Pond, pr	104	.....		2,000,000	6 cum.	1½ Q.	Mar., 1911
Otis Elevator Co	60	+1	Mar. 20	6,375,000	3	1½ S. A.	Oct., 1910
Otis Elevator Co., pr	97	.....		6,310,000	6 n. c.	1½ Q.	Jan., 1911
Pa. Steel	60	.....	May 8	10,750,000		.....	.....
Pa. Steel, pr	106½	.....		16,500,000	7 n. c.	3½ S. A.	Nov., 1910
Pittsburg Coal Co	20¼	— ¼	Feb. 10	28,104,600		.....	.....
Pittsburg Coal Co., pr	71	+ ½		27,071,800	7 cum.	1¾ Q.	Jan., 1911
Pressed Steel Car	33	—2¾	Feb. 15	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr	97¾	—1⅛		12,500,000	7 n. c.	1¾ Q.	Feb., 1911
Pullman	160½	— ½	Nov. 8	120,000,000	8	2 Q.	Feb., 1911
Railway Stl. Spring	35	—1	Mar. 2	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	97¾	—1¼		13,500,000	7 cum.	1¾ Q.	Mar., 1911
Rep. Iron & Steel	32⅝	—1⅝	Oct. 18	27,191,000		.....	.....
Rep. Iron & Steel, pr	97¾	—1⅛		25,000,000	7 cum.	1¾ Q.	Apr., 1911
Sloss-Sheffield	53¾	.....	Mar. 15	10,000,000	5	1¼ Q.	Sept., 1910
Sloss-Sheffield, pr	112	.....		6,700,000	7 n. c.	1¾ Q.	Jan., 1911
U. S. Pipe & Fdy. Co	18⅜	+ ⅜	June 28	12,106,300	2	1 Q.	Dec., 1910
U. S. Pipe & Fdy. Co., pr	59	+1⅞		12,106,300	7 n. c.	1¾ Q.	Mar., 1911
U. S. Steel	77⅝	—3¼	April 17	508,302,500	5	1¼ Q.	Mar., 1911
U. S. Steel, pr	118½	— ⅞		360,281,100	7 cum.	1¾ Q.	Feb., 1911
U. S. Steel 5s	105	.....		463,798,000	5	.....	.....
Va. Iron, Coal & Coke	61	—5	Sept. 19	9,073,680		5. †	Oct., 1907
Westinghouse Electric	69	—1	July 26	3,998,700*		5¼ Q. **	Jan., 1911
Westinghouse Air Brake	142½	—1½	Oct. 3	13,750,000*		5 Q. ‡	Jan., 1911

Par value of shares, $100, except those starred (*), $50.
**Includes 3½ per cent on back dividends.
†Stock.
‡Includes 1½ extra and 1 special.

Copper Stocks.

New York.—Amalgamated Copper closed 63⅜, a net loss of 1⅜.

Boston.—Butte Coalition closed 18⅛, a net loss of ⅞; Calumet & Arizona closed 51½, unchanged; Calumet & Hecla closed 500, a net loss of 5; North Butte Mining closed 28, a net loss of 1; Quincy Mining closed 67, unchanged.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

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THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

March	5,754
April	5,793
May	5,827
June	5,842
July	5,864
August	5,875
September	5,895
October	5,955
November	5,993
December	6,026
January, 1911	6,058
February	6,072

March 2, 1911

The Freight Rate Decision

It is easily realized from the amount of time and energy expended by the parties concerned in the famous rate cases before the Interstate Commerce Commission that very serious issues were involved. It is idle to infer that the railroads were fighting for what was set down in black and white in the documents, for all the rate advances directly at issue would amount to no more than a few tens of millions of dollars a year. It is equally idle to infer that the government was very seriously concerned with the individual advances desired, for it would hardly be possible in that case for it to refuse to grant each single advance asked for.

Each side, as a matter of fact, was fighting for a principle. The railroads, in the rather poorly managed publicity campaign which they waged, claimed they desired the advances in order to equalize their high cost of living—the advances in the prices of commodities and wages. This being at a time when earnings were at least not far from the highest on record, the proposition can be baldly stated that the railroads expected the public to pay them such an annual sum as would cover their disbursements at the rates they had themselves determined upon, the determination including those of the quantity of securities and of the rates of interest or dividend thereon. The much mentioned market for their bonds was to be made by the declaration of a principle that the public would stand back of the railroads and see that at all times they could meet any obligations they had chanced to incur. That was, all must confess, a principle quite well worth fighting for.

The government position was of course primarily one of enforcing the law, but the law refers decisions under it to the issue of fairness and reasonableness. From this standpoint the government had to consider the broad problem of the cost of living, and in any event the railroads left it no alternative but to do so, for they focussed attention upon the wage advances they had made and the high cost of living generally assumed to have brought them about.

The government found an opportunity in this issue to check one of the tendencies toward increasing the cost of living. It found in full operation in this railroad matter a principle of putting up one thing because another had been put up, and then putting up the other because the first had been put up. Unless something could be done, there would be no end to the process. Not only would the direct results of such a process be bad; the indirect results would also be bad, as offering an easy way out of difficulties, rather than the more progressive way of enforcing economies and finding better ways of conducting physical operations, whether moving a freight train or repairing an engine.

Far from the attitude of the government requiring to be discerned from the decision as made only last week, the words of Commissioner Lane at the hearing in Chicago, Sept. 22, 1910, may be recalled:

> As the country develops there will be more and more freight delivered to you, and as conditions are now the rates constantly must be increased. I regard it as a serious menace to the western country if the rates constantly are to be increased. We must work out this problem on lines other than by the proposed method of raising the tariffs. If not, there is no time when we can say the maximum has been reached.

To this may be added the observation that as advanced rates would be borne by the public, the cost of living would be advanced and this in turn would react upon the railroads by requiring higher payments for labor and commodities.

In checking the freight rate advances and in arranging for reciprocity with Canada, the government is doing two things directly calculated to curb the tendency of the cost of living to advance.

It is now up to the railroads to work out their problem along the line of reducing the cost of conducting their operations. It has been said that by introducing the proper economies the railroads could save a million dollars a day. That may not be mathematically correct, but men conducting large manufacturing operations have no patience with the railroad men who scout the whole idea, for they know that manufacturing operations are at this time undergoing a revolution through the introduction of economies of precisely the character needed by the railroads. Manufacturers know that only a beginning has been made, in industry at large, in the matter of reducing given manufacturing operations to a system, and eliminating unnecessary formalities in the conduct

of the business department. Devoted as railroading naturally is to the following of precedents, it would be absurd to think for a moment that the railroads are ahead of manufacturing industries in introducing these economies, and for railroad men to claim that there are none to be introduced is merely to confess that the beginning has not even been made.

The "efficiency engineer" of whom we hear so much nowadays represents a conception but lately tolerated by manufacturers and not yet tolerated by railroads, the spirit of their management being that no good thing can come but out of their own ranks. The world moves, and these innovations come rapidly to be accepted. Less than half a generation ago, the advertisers in trade and technical journals ridiculed the idea that the professional advertisement writer could possibly be useful to them. It was an insult for him to presume that he could possibly learn enough of their business to become of service. How quickly the revolution has occurred in this field may be realized by leafing over the advertising pages of any of these journals and noting the exceptional advertisements which by their oddity proclaim that in the particular instance the expert advertisement writer has not yet been called.

It is well to observe that had the full rate advances desired by the railroad been permitted, there would in all probability have been an immediate exemplification of this tendency to travel in a circle which the government was particularly anxious to check. A part of the railroad campaign was to obtain the signatures of their employes to petitions setting forth that the rate advances were needed in order to pay good wages, and unquestionably the granting of the advances would have been followed by unrest, if not by immediate demands for increased wages. Support to the movement was also solicited from practically everybody who has anything to sell to railroads, encouraging the view that if by such aid the cause should be won, those who furnished the aid should be rewarded. As the railroads insisted they were forced to pay higher prices for what they bought, each individual would be disposed to examine into his selling prices, and if he found they were lower than formerly, he would be pretty certain to feel that here was just ground for advancing his prices. Here, then, would have been an immediate stimulus to the very thing which the future welfare of this country requires should be checked. In other words, if the railroads knew that they could easily meet increased expenses by advancing freight rates, they would have little, if any, objection to granting wage advances whenever requested or to paying ever increasing prices for all kinds of equipment. The ease with which railroad directors and other officials would consent to paying higher prices for maintenance and new equipment might be still further enhanced by such buyers being also connected with manufacturing concerns.

We refuse to believe that this rate decision is important as to determining the rate at which railroads will spend money for improvements in the next few years. The amount actually at stake, of course, was inconsequential. We have seen no trustworthy estimate of the entire amount, but the figures prepared in Washington arrived at the sum of $27,000,000 a year involved in the advances desired in central classification territory. Supposing the whole amount were $50,000,000, this would be less than 5 per cent of the value of the output of the iron and steel industries in an ordinarily good year, valuing the various products at the stage of manufacture at which they would pass to railroad ownership. Obviously the railroads did not intend to spend the increased revenue wholly or even largely in the iron industry, but even were such the case, the vicissitudes of the iron industry are such that 5 per cent more or less would not be worth much thought. However, as remarked at the outset, what the railroads fought for was presumably not these specific advances, but the general principle that they should be allowed to advance rates at will so that they could establish credit for loans. There has, however, been no rational testimony to the effect that had these advances been granted the railroads really would have borrowed money and made important extensions. It is very cheap politics for the railroads to attach the poor prospect of large railroad expenditures to the refusal to permit rate advances, for that poor prospect is no new thing at all. An illustration may be furnished by quoting from our editorial column of Jan. 30, 1908, three years ago, where, under the heading, "Railroad Facilities or Railroad Buying," it was remarked: "An undue amount of pessimism is being indulged in because of the prospect that railroad buying will be on a reduced scale for a number of years," and the editorial went on to show, with adequate statistical proof, that "in a period of seven years, 1881 to 1887, inclusive, there were heavy railroad expenditures, just as there have been in the seven years, 1901 to 1907, inclusive, while in the years following 1887 there were light railroad expenditures." The iron trade, of course, was quite prosperous for several years after 1887, and the argument was that the period of great railroad building furnished the facilities for expansion in the commerce of the country, whereby the iron industry profited. In the long run, the iron industry will profit more by the railroads furnishing good and cheap service to the country than by their squeezing the public and rushing into extensions. In the present issue, however, the government held that there was a squeeze, while no one showed that the much discussed improvements were more than a will o' the wisp.

ANOTHER VIEW

Of the Iron Ore Price Situation—Stability Policy Discussed.

Editor THE IRON TRADE REVIEW:—The suggestions of "Ore Buyer," embraced in your editorial on "Greater Stability in Ore Prices," in THE IRON TRADE REVIEW of Feb. 16, appeal strongly to every independent maker of pig iron (the word "independent," as applied to blast furnace operators without their own ore resources, is a misnomer, and should be *dependent*). We should have more stability in this country in everything, even politics and religion, to help remove uncertainties and make life more worth while. At first blush

the plant of "Ore Buyer" would seem to be a step in this direction. If carried out, it would remove a perplexing uncertainty, but would it improve conditions? Analyzing the proposition carefully, can we be sure it would work out satisfactorily? This would depend entirely on the price fixed. If as high as the average price for the past five years, as referred to by "Ore Buyer", the results would be unfavorable, if not disastrous, to the independent, because the margin of profit in ore on the basis named is so large that the makers of pig iron who own their own ores would be able and perhaps not unwilling to take the trade completely away from the independent operator, as they usually do during periods of over-production or under-consumption, through the sacrifice of one of their two profits, either that on ore or on pig iron. With a high price on ore established permanently for a number of years, say five, the "vested interests" (using a fashionable expression to designate the operators of both blast furnaces and ore mines, but not in an individual sense) could in due time manipulate the independent makers of pig iron completely out of business. There is a tendency in this direction now, clearly evidenced by the constant and unnecessary increase of blast furnace capacity by the very few interests that control the Lake Superior ore situation.

Three dollars per ton, instead of four, for Old Range non-Bessemer, delivered at lower lake ports would put the independents in a fair and safe position, but such a price cannot be expected; it would not give leeway enough to the "vested interests."

"Ore Buyer" says, "the peculiarities of the iron ore market make it differ from other parts of the great fabric of iron and steel", and he might well have said all other kinds of business, but he does not say whether these "peculiarities" are due to nature or agreement. Why should not the ore producer mine during the winter and stock his material, whether it is sold or not? The fact is he does. But where the trouble comes is in the buyer having to contract for his year's supply, if he gets one, from 12 to 18 months before he consumes the last of it, when so many things can and do happen in this great country within that period. The buyer takes all the chances, and long ones at that, while the seller takes not one.

It is the writer's opinion that unless the price of ore is reduced 25 per cent and fixed at this basis for at least five years, there should not be any reduction whatever for 1911 from present prices. The furnacemen who carry over large stocks on account of having curtailed their make to help the market and general conditions should be given an opportunity to get out from under their burden in as easy and unharmed a way as possible, and not be sacrificed for the benefit of those whose stock of ore is light, and who will be greatly benefited and put in a highly advantageous position by a 50 cent reduction. Without any reduction we will have to meet the "vested interests" in the usual way, it is true, but we are used to that and can stand it a while longer. The independent ore producer is cutting more and more of a figure, and in time, if he continues to exist, he may find it necessary to stand in with and protect the independent merchant furnaceman.

Not only should the price of ore not be reduced but it should be announced at once in an unmistakable and authoritative way that it will not be. This will settle a good many important questions, and those not settled can be taken care of when reached.

Already consumers of pig iron are seeking to cover for the last half at present prices, stating with strong emphasis that ore is to be dropped 50 cents per ton and that there is no justification in asking more for pig iron. Uncertainty on this point should be removed and the future made as clear as possible.

The powers that be, not more numerous than the fingers on two hands, know now what the price of ore for 1911 will be, and should not seek to flim-flam and whip-saw the public and those on the outside the golden circle by withholding this knowledge to promote their own interests.

ANOTHER ORE BUYER.

Effect of Reduction in Tariff.

Editor THE IRON TRADE REVIEW:

I am very much interested in the article appearing on page 344 of your issue of Feb. 16. It seems that "Ore Buyer" did not give any consideration to the large reduction in the tariff on pig iron. It would seem that that had material effect on the price of pig iron, especially in the eastern states, as it made it possible for large users, especially the pipe manufacturers who can take water deliveries, to import British iron and immediately this brought the eastern price down to this figure. J. R. SCHURZ.

39 Cortlandt street.

New York, Feb. 24, 1911.

American Representation at Belgian Meeting

Some discussion was given at the meeting of the directors of the American Iron and Steel Institute at New York, Feb. 23, to the invited attendance of iron and steel manufacturers of the United States at the international meeting of steel makers to be held at Brussels, Belgium, in July. Because of the fact that it is the plan of the European makers arranging the meeting, to make it a representative one rather than a general assemblage of manufacturers, the present idea is to confine the official representatives of the American Iron and Steel Institute to the executive officers and the directors. This will mean the presence of about twenty steel makers of this country as official delegates but as the meeting will be open to all members of the institute a number of other manufacturers of this country will doubtless be in attendance, as considerable interest in the approaching conference is being manifested. The German institute of steel makers, with a membership of about eight hundred, will be officially represented by nine delegates, while the British Iron and Steel Institute, which has about one thousand members, will select about a dozen of its number as its official representatives. Other countries will follow a similar plan.

Business considered at the meeting of the institute directors was largely of a routine nature. Seven new members were elected.

The walls of the institute headquarters at 30 Church street, New York, are now being hung with large and handsomely framed photographs of the officers and directors of the organization and of other prominent iron and steel manufacturers and metallurgists of this country.

Elected President

J. K. Dimmick, of Philadelphia, was elected president of the Dimmick Pipe Co. at the recent annual meeting of the company at Birmingham, Ala. He will succeed his son, Fred D. Dimmick, who has exchanged places with his father and will return to Philadelphia to assume charge of the business of J. K. Dimmick. Other officers re-elected were: Secretary and treasurer, James H. Goodapple; directors, James Bowron, Culpepper Exum, Erskine Ramsay, A. J. Goodwin, A. J. Bowron, J. K. Dimmick and J. H. Goodapple.

Manufacture of Machine-Molded Piano Plates

Economies Effected by the Use of a Stripping Plate Molding Machine—Process for Casting in the Hitch Pins

By the use of a stripping plate molding machine in the manufacture of piano plates, great economies have been effected by the W. W. Kimball Co., Chicago. Not only has the cost of molding been reduced practically two-thirds by the installation of this labor-saving device, but the drilling of the plates and the fitting of the string-supporting pins has been eliminated. An improved product is another important benefit derived from the application of modern methods to this practice, which has not kept pace with the advancement of other branches of the foundry industry in the last decade. That piano plates, owing to their size and skeleton-like frame, could not be successfully machine-molded, was one of the traditions, which until recently, retarted progress in this art. Foundrymen specializing in this line of work were of the opinion that the castings were too thin and of too great area to permit of molding the patterns on molding machines, and, in addition, it was claimed that the skill of experienced molders was required to insure straight, flat castings.

Less than a year ago, the Kimball company decided to erect a foundry for the manufacture of these plates for use in its factory, which has an annual output of 18,000 pianos. The erection and equipment of the plant was placed in charge of Albert A. Huseby, an engineer, connected with this concern, and without previous foundry experience. After a careful investigation of the established, hand-molding methods, he concluded that the application of molding machines to this class of work was not impossible of accomplishment and he believed, furthermore, it entirely feasible to cast the pins into the plates, thus obviating subsequent drilling and fitting. For adapting a molding machine to this work, he sought the aid of Henry E. Pridmore, molding machine manufacturer, Chicago. It was decided to mount the pattern on a stripping plate machine and after a number of molds were successfully made in this way, at a greatly reduced cost over hand-molding, Mr. Huseby developed a process for casting the pins into the plates and the equipment for accomplishing this was applied to the molding machine.

One of the plates with the steel pins cast in, is shown in Fig. 8. It will be noted that the casting is cored out to reduce its weight and is well-ribbed to prevent warping. This plate is approximately 48 x 60 inches, varies from $\frac{5}{16}$ to $\frac{3}{8}$ inch in thickness and weighs 133 pounds. For supporting the strings, 135 pins are required, and it is still the customary practice, on hand-molded plates, to drill holes into the casting, into which the pins are driven. Unless the holes are accurately drilled, the pins will not withstand the tension of the strings, and the proper spacing of the pins is also essential to the correct stringing of the wires. The pins are made of soft steel, $\frac{5}{8}$ inch long, and are hammered over to prevent the strings from slipping off. By casting the pins in the plate, all of the previous difficulties have been overcome and, in addition, the pins are more firmly secured than when held by a driving fit.

The stripping plate machine, on which the drag half of the mold is made, is shown in Figs. 2 and 3, the former illustrating the pattern in molding position, and the latter is a view of the pattern dropped away from the mold. The machine is one of the standard types, built by Henry E. Pridmore, which has been equipped with the Huseby device for supporting the pins during the mold-forming operation. Before ramming the mold, the pins are set into openings drilled into the patterns, as shown in Fig. 2. The pins are supported and held in position in the pattern by stools or spindles, clearly shown in Fig. 3 and in the cross-section of the machine, Fig. 7. The stools are $\frac{5}{8}$ inch

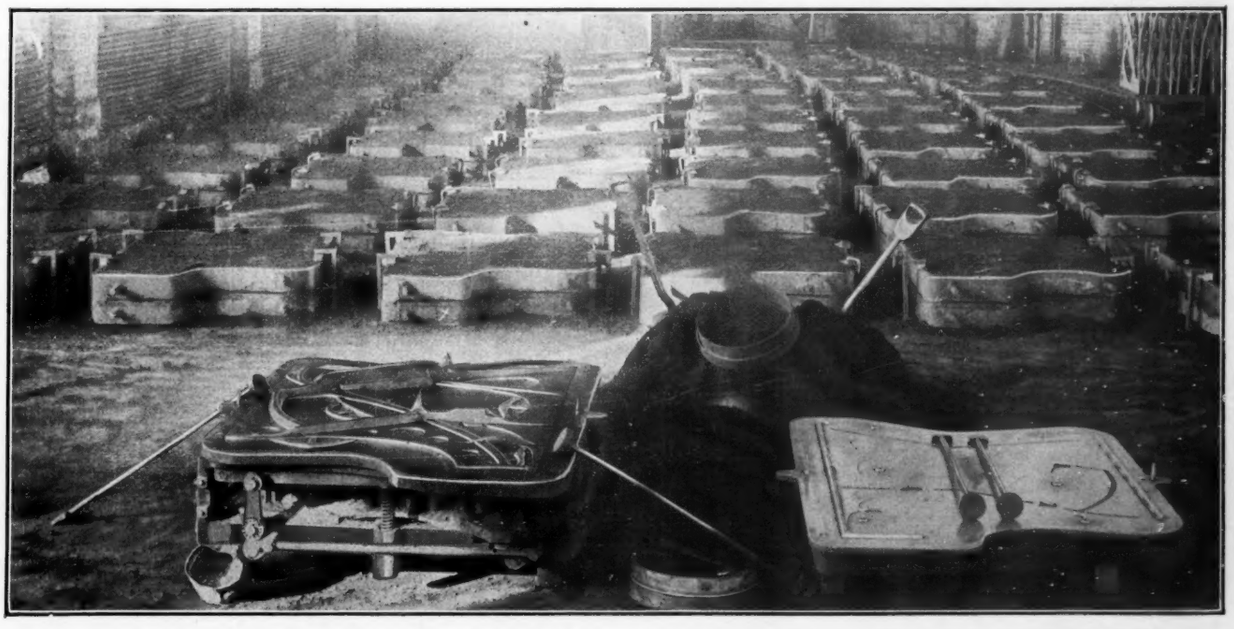


FIG. 1—A FLOOR OF 60 PIANO PLATE MOLDS; THE STRIPPING PLATE MOLDING MACHINE, ON WHICH THE DRAGS ARE MADE, IS SHOWN IN THE FOREGROUND AT THE LEFT, AND THE COPE STAND AT THE RIGHT.

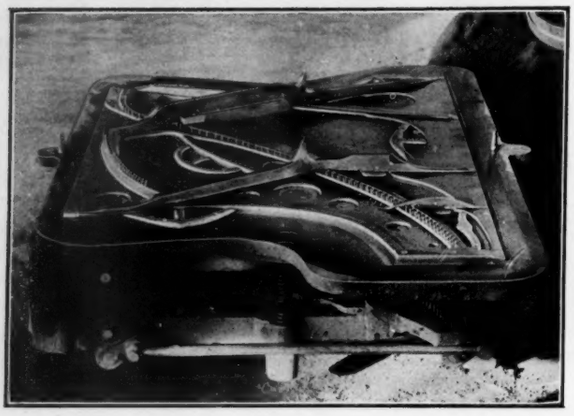


FIG. 2—THE STRIPPING PLATE MACHINE ON WHICH THE DRAG IS MOLDED; THE PINS ARE SHOWN INSERTED IN THE PATTERN.

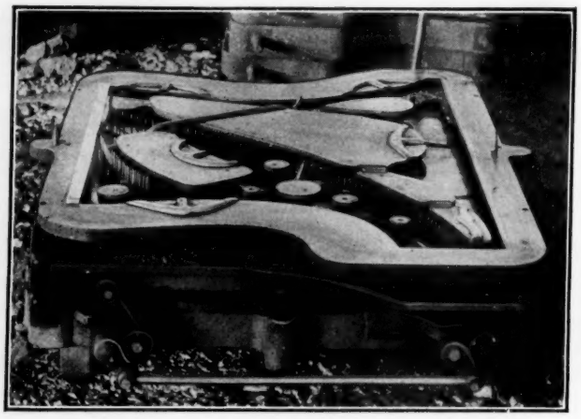


FIG. 3—THE PATTERN LOWERED, SHOWING THE PIN-SUPPORTING STOOLS OR SPINDLES.

below the face of the pattern and the pins extend this distance beyond the face of the mold, as shown in Fig. 5. After inserting the pins in the pattern, the drag flask is set in position on the machine, filled with sand and rammed. The sand is tamped firmly about the pins as well as other parts of the pattern, and when stripping the pattern away from the mold, the stools or spindles support the pins which are embedded in the sand at their opposite ends. When the mold is lifted off the machine, Fig. 5, the pins are carried in the sand and project into the mold $\frac{1}{8}$ inch. The cope half of the mold is rammed on a stand, shown at the right in Fig. 1, and in the foreground, in Fig. 6. After ramming, the mold is merely lifted off this stand, this operation being similar to that usually practiced when molding the drag on a stripping plate machine.

The pins are neither previously prepared nor coated, but are used in the polished condition in which they are received. No difficulty has been experienced from crystallization, as might have been expected when casting molten metal against so small a surface, and the pins are more firmly embedded in the iron than when driven into the drilled openings in the plate. To obviate the burning or crystallization of the pins, the gates have been so arranged that the ribs carrying the pins do not receive the first flow of the hot metal and the iron is poured at a slightly lower temperature than is customary for thin work. Six gates are provided, as shown in Fig. 2, and in the perspective view of the machine and pattern, Fig. 4, and the mold is poured simultaneously from six ladles.

When made by hand, the daily output of a molder and helper averages from six to seven molds. By the use of the stripping plate machine and the cope stand, five unskilled men produce 65 molds per day, a floor of 60 molds, shortly before pouring-off, being shown in Fig. 1. To equal the record of machine molding would require 18 men—nine molders and nine helpers—when molding by hand. In addition to performing all of the necessary molding operations, the five men set the pins, which is not required of the floor molders. To expedite the machine work, special cast iron flasks have been provided, which carry the minimum amount of sand necessary for making the molds. The flasks are lifted off the stripping plate machine and are rolled over by an air hoist, which is also used for closing the mold. As the foundry has a cement floor, a 1-inch bed of sand is prepared for each mold. A frame, slightly larger than the flask is used for making the bed and the surplus sand is removed with a rake. The duties of each of the crew of five men are clearly defined and the work is specialized as much as possible. Two of the operators are assigned to the drag machine and two to the cope stand, while the fifth man of the gang makes the bed, sets cores and closes and clamps the molds. In making these molds, a large quantity of sand is handled daily by the molding machine crew and one of the heaps in the morning, before the commencement of molding operations, is shown at the left, Fig. 6.

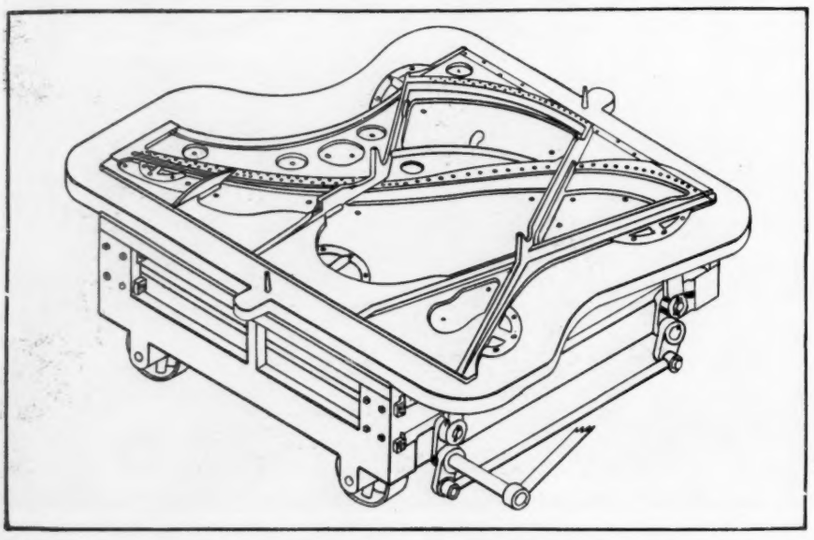


FIG. 4—A PERSPECTIVE VIEW OF THE STRIPPING PLATE MOLDING MACHINE, SHOWING THE OPENINGS IN THE PATTERN IN WHICH THE PINS ARE INSERTED

A stripping plate molding machine and cope stand for molding larger plates, 50 x 60 inches, and weighing 183 pounds, are now being built by Henry E Pridmore. The machine will be similarly equipped for casting the pins in the plate, but in addition to the 135 hitch pins in the smaller casting, 45 bridge pins must be inserted.

The foundry, built by the W. W. Kimball Co. for the exclusive manufacture of piano plates, is 220 x 80 feet, and in addition to the molding floor contains a cleaning room, equipped with a sand blast and a finishing department, in

FIG. 5—DRAG HALF OF THE MOLD, SHOWING THE PINS IN THE SAND.

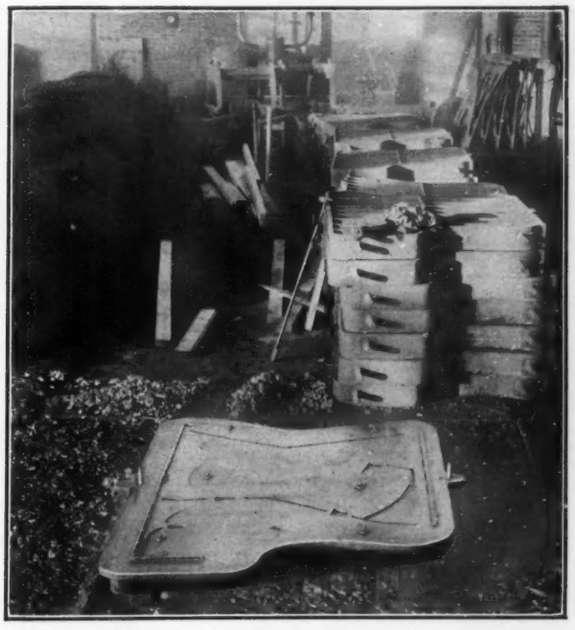


FIG. 6—THE COPE STAND ON WHICH THE COPE HALVES OF PIANO PLATE MOLDS ARE MADE.

which the plates are japanned and varnished. The iron is melted in a 55-inch cupola, lined to 37 inches, installed by the Whiting Foundry Equipment Co., Harvey, Ill., and the blast is furnished by a blower, built by the P. H. & F. M. Roots Co., Connersville, Ind. The blast from the blower is delivered into two branch pipes, the one connecting with the wind belt of the cupola and the other extending outside of the building. Each pipe is provided with a gate to regulate or shut-off the blast and if too much air is being delivered into the cupola, the gate in the other pipe is opened, thereby reducing the volume of air to the furnace. This arrangement permits of the easy regulation of the blast, which is under the control of the melter at all times. No special iron mixture is used other than is ordinarily required for making light castings.

After the castings have been cleaned, they are conveyed to the finishing department on trucks, operating on industrial railway tracks, as shown in Fig. 1. After the japan is applied to the plates, they are permitted to remain three hours in an oven heated to 350 degrees Fahr. After the plates have been removed from the oven and cooled, they are rubbed and varnished and are again placed in an oven heated to 180 degrees Fahr., where they are permitted to remain for two hours. The castings are rolled into the ovens on trucks and after finishing, they are delivered to the warehouse by an electric car, operating in the yard, on the same trucks by which they were conveyed to the finishing department from the casting cleaning room.

Advocates New Jersey's Liability Law

W. B. Dickson, first vice president of the United States Steel Corporation, spoke, Feb. 14, before the committee on corporations of the state senate of New Jersey in support of the employers' liability bill prepared for enactment in that state by a special commission, of which he is a member. Mr. Dickson said that the proposed measure was the result of months of study and research and that, although it went further than any other similar statute in force in this country, he believed it provided an equitable adjustment between manufacturers and employes. The bill as drawn abolishes the assumption of risk on the part of the employe, establishes a schedule of compensation and regulates procedure for the determination of liability. Opposed to Mr. Dickson in his view were manufacturers from different parts of the state who objected to the proposed bill as imposing too great a burden for employers of labor.

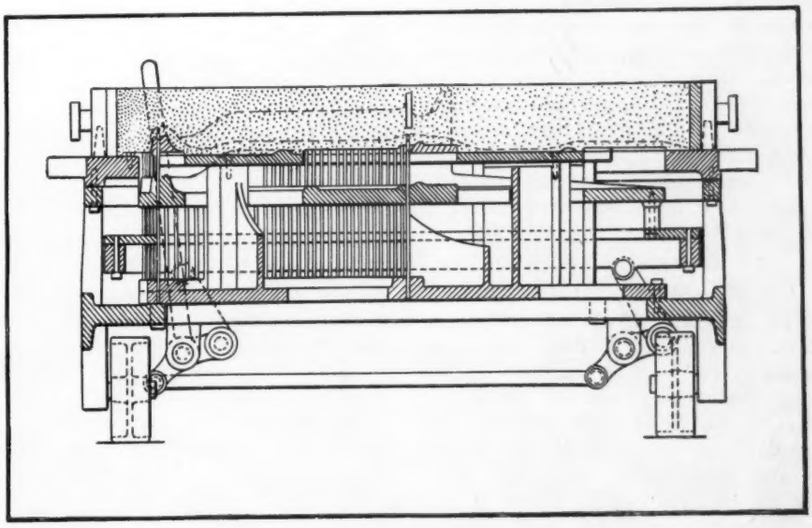


FIG. 7—A CROSS-SECTION OF THE MOLDING MACHINE, SHOWING THE PIN-SUPPORTING STOOLS OR SPINDLES.

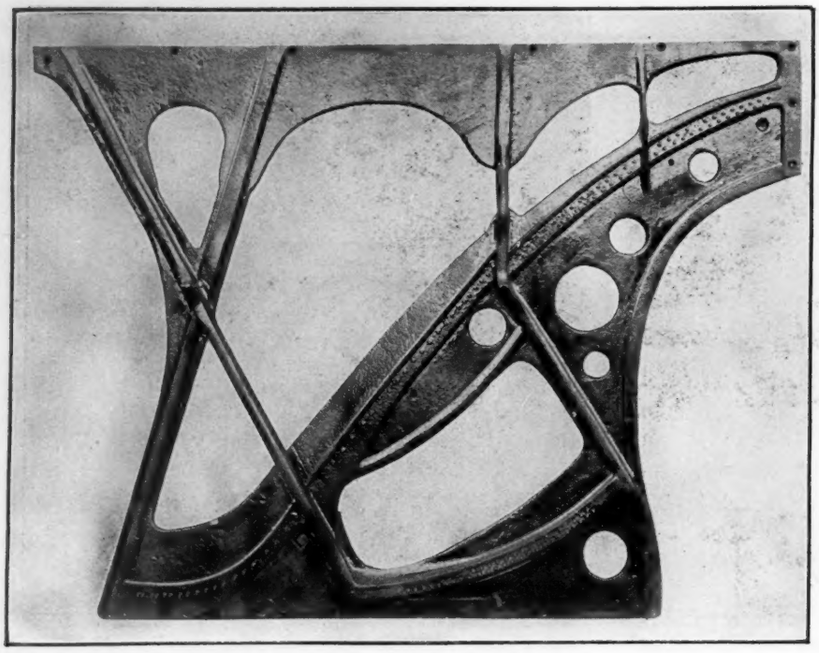


FIG. 8—ONE OF THE PIANO PLATE CASTINGS WITH THE PINS CAST IN.

Iron Ore Railroad

At the recent annual meeting at Duluth, of the Duluth, Missabe & Northern railroad, one of the largest iron ore transportation railroads in the world, Archibald T. Banning was elected secretary, succeeding E. B. Ryan, resigned. These directors were elected: W. A. McGonagle, who was also re-elected president; W. J. Olcott, E. S. Kempton, George D. Swift, H. L. Dresser, D. G. Kerr and W. J. Filbert. The other officers were re-elected. Reports showed that the railroad had delivered 13,609,155 tons of ore to its Duluth ore docks in the season of 1910. It began hauling ore in 1893, when 431,040 tons were shipped. In 1902 it passed the 5,000,000-ton mark. It has 110 locomotives, 7,000 ore cars beside general freight and passenger equipment. There are 298 miles of main track and in the yards at Proctor alone there are 40 miles of side track. It is completing large shops at Proctor.

The Gray-Hawley Mfg. Co., Detroit, Mich., maker of motor car and motor boat accessories, advises respecting some recently noted new construction that the factory will be 88 x 200 feet. The front part will be two stories and will contain the offices, vaults, sales room, etc. The wings of the building will be one-story, and will contain receiving and shipping departments, machine shops, assembling room, etc. The building will be of brick and concrete, and will be ready for occupancy March 1. The company has contracted for everything needed for both construction and equipment.

Machine and Electric Equipment Needed

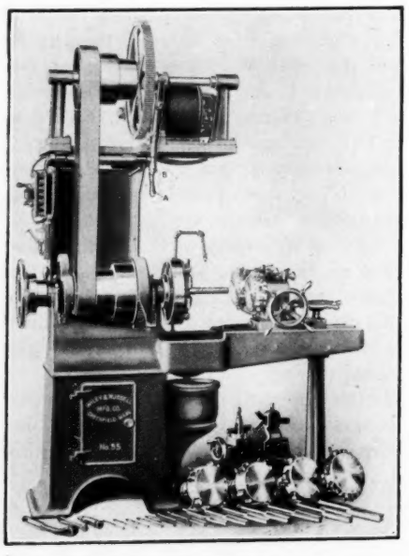
The General Fire Extinguisher Co., Providence, R. I., which is erecting plant additions at Warren, O., advises that the addition under construction is 150 x 350 feet, which will be occupied as an extension to the pipe storage and pipe cutting department. In this addition it will need ten additional pipe threading machines, two cutting-off machines, a five-ton crane with 25-foot lift, a 60-foot electric traveling crane, together with something like 30 individual motors for driving the pipe threading machines, both old and new, the intention being to change over from belt drives to electric drives. The addition and its complete equipment will be devoted to cutting and threading the wrought piping systems needed in constructing the company's Grinnell automatic fire sprinkler system throughout the west.

The Buckeye Steel Castings Co., Columbus, O., whose purchase of 85 acres at Indiana Harbor, Ind., was recently noted, advises that while the purchase has been made, yet no definite plans for building have been determined.

Motor-Driven Die Machine

The accompanying illustration shows a new motor-driven machine designed by the Wiley & Russel Mfg. Co., Greenfield, Mass., for tapping nuts and threading and cutting-off bolts and pipe. It is a standard combination opening die machine equipped with quick-change opening dies, and consists of a bracket fitted and bolted to the bed on which the motor shelf is secured. This shelf is hinged at the back and is fitted with finished projecting lugs which rest on the cam shaft operated by the lever *A*, by means of which sufficient tension can be kept on the belt at all times and still allow it to be slackened off when it is necessary to shift it from one step on the cone pulley to another. After the belt is tightened the cam shaft is locked with a binder.

The lever *B*, in front of the motor, controls the clutch in the large spur gear to enable the bolt cutter to be stopped independently of the motor. The latter has a capacity of two-horsepower, is back-geared and is fitted with a rawhide pinion. It has a constant speed and can be furnished for either direct or alternating current, reversing or non-reversing. The machine is strongly built and carefully



COMBINATION DIE MACHINE

fitted together, and is guaranteed to cut bolts and pipe up to 2 inches in diameter.

The Savill-Chandler Co., Canton, Ill., has certified to a change of name to the Canton Foundry & Heating Co., and also an increase in capital stock from $40,000 to $150,000.

Electric Locomotives for Pennsylvania Terminal

The Pennsylvania railroad has ordered nine additional electric locomotives, aggregating about 40,000 horsepower, from the Westinghouse Electric & Mfg. Co., Pittsburg. These locomotives will be of the same type as those which are now being operated in the Manhattan Terminal, New York City, and will supplement the 24 now in use. The locomotives are to be completed by July 1, this year. The cabs, frames, running gear and mechanical parts will be built by the Pennsylvania railroad at its Juniata shops; the air brakes will be supplied by the Westinghouse Air Brake Co., and the electrical equipment will be built and the locomotives assembled at the East Pittsburg, Pa., works of the Westinghouse Electric & Mfg. Co.

The Pennsylvania locomotives are by far the most powerful ever built. This type of locomotive is an articulated machine of double cab design. Each half carries its own motor and complete equipment, the other halves being coupled together at their driving wheel ends. The frames, driving wheels and trucks of the running gear are similar to those of the American type steam locomotive. The coupled ends are fitted with permanent couplings of twin bars and Westinghouse friction draft gear, so arranged that the leading half serves as a leading truck and the other half as a trailer in whatever direction the locomotive may be moving. The machines are so arranged that in event of one motor being cut out, the entire machine can be operated from either cab with the remaining motor. The halves are interchangeable and if one is out of service it can be replaced by another half while repairs are being made. The unit switch field control permits two or more locomotives to be coupled together, all to be operated from either end of any one cab, and affords flexibility of speed regulation.

Some of the features of these direct-current, 600-volt, electric locomotives, follow: Weight of locomotive, 156 tons; weight on drivers, 200,000 pounds; weight on each driving axle, 50,000 pounds; total wheel base of locomotive, 55 feet 11 inches; diameter of drivers, 72 inches; normal speed with full train, 60 miles per hour.

Motor and Running Gear of a Pennsylvania Electric Locomotive

Each locomotive is provided with two direct-current, inter-pole motors, having cast steel frames, direct-connected through jack shafts and side rods. The weight of each motor complete with cranks is 43,000 pounds. Since Nov. 27, 1910, the entire through passenger traffic of the Pennsylvania railroad in its Newark tunnels has been handled by the electric locomotives of this type. Very heavy trains, far beyond the capacity of the usual passenger locomotive, have been handled over the tunnel grades. In the accompanying illustrations are shown the motors and running gear of one of the Pennsylvania electric locomotives, as well as one of the locomotives and an eight-car train at the tunnel entrance in New York City.

Pennsylvania Electric Locomotive; An Eight-Car Train at the Tunnel Entrance, New York City

Spring Meeting of the A. S. M. E.

The spring meeting of the American Society of Mechanical Engineers will be held in Pittsburg from May 30 to June 2. This is the first meeting of this organization in that city since 1884. A local committee consisting of E. M. Herr, chairman; George Mesta, J. M. Tate Jr., Chester B. Albree, D. F. Crawford, Morris Knowles and Elmer K. Hiles has been appointed to make arrangements for this meeting. In addition to the professional sessions a number of inspection trips are planned to various industrial plants in the Pittsburg district. The headquarters of the local committee have been established at 2511 Oliver building.

A Meter for Measuring Blast Furnace Gas

An Electrically-Operated Meter of Novel Design for Measuring Gases Flowing Through Pipes—Features of Construction

A meter for measuring blast furnace gas, air, or other gases, particularly in large quantities, operated by electricity on a principle radically different from that underlying most other gas measuring apparatus, has recently been perfected by the Cutler Hammer Mfg. Co., Milwaukee. It is known as the Thomas meter and is the invention of Prof. Carl C. Thomas, head of the department of steam and gas engineering at the University of Wisconsin. The meter is the commercial outgrowth of a very thorough and extensive laboratory investigation of the specific heat of superheated steam which has been carried on by Prof. Thomas for a number of years.

The operation of the meter depends upon the principle of adding electrically a known quantity of heat to the gas and determining the rate of flow by the rise in temperature of the gas between the inlet and outlet of the meter. This principle lends itself to the operation of a meter having no moving parts inside or in contact with the gas. The accuracy of the meter and its sensitiveness are independent of the rate of flow of gas or of fluctuations in pressure and temperature and it may be used to measure gas at any pressure. It is independent of small fluctuations in pressure, such as those in the discharge from an air compressor or in the suction of a gas engine. The meter produces a continuous autographic record, showing the rate of flow and its variation, and gives a record in "standard cubic feet" of gas, referred to any standard of pressure and temperature, as, for example, 60 degrees Fahr. and 30 inches mercury. Some gases, as for example blast furnace gas, carry mechanically suspended excess moisture from cleaning apparatus, condensation, etc. Where this is likely to be the case, the inlet to the meter is provided with a separator, and a small steam coil or radiator is placed in the gas passage by means of which the pipe is freed from water and the gas is completely dried before it enters the meter. A very small amount of steam suffices for this purpose. The record of rate of flow can be taken at any distance from the meter at any point where it is most convenient to locate the switchboard and recording mechanism.

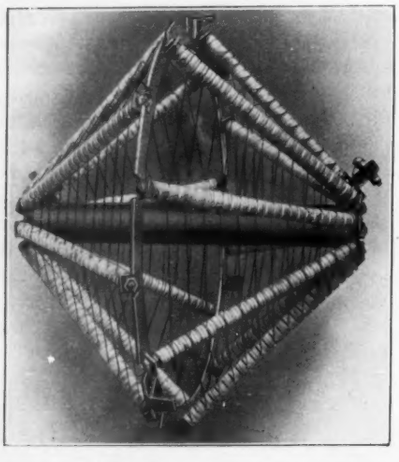


FIG. 1—HEATER LOCATED IN THE METER CASING.

Construction of the Meter.

A cross-section of the meter casing, which constitutes the portion of the apparatus inserted in the pipe line carrying the gas or air to be measured, is shown in Fig. 6. In the center of this casing is an electrical heater, *B*, shown in detail in Fig. 1, formed of suitable resistance material disposed across the gas passage in such a way as to impart heat to all of the gas passing through the pipe line of which the meter forms a part. The temperature of the gas is thus raised from that at entrance to some higher exit temperature and the rise of temperature is controlled by means of the two electrical resistance thermometers, *E*, Fig. 6, on the two sides of the heater, in connection with the automatic regulating mechanism on the switchboard.

Th thermometers, Fig. 3, are in the form of screens of resistance wire, so disposed as to come in contact with all the gas passing through the meter. They form two arms of a Wheatstone bridge which, by means of the deflection of a galvano-meter needle, causes the controlling mechanism to cut in or out the electrical energy required to maintain a fixed temperature change in the gas. The record of gas flow is read directly from the dials of a commercial watt-meter of the integrating type; or, if desired, from a curve drawn by a graphical watt-meter.

The meter is so adjusted at the start that a fixed difference of two degrees Fahr. between the entrance temperature and the exit temperature of the gas or air is maintained. For example, it may be assumed that a weight of gas equivalent to 50,000 cubic feet per hour is flowing through the meter and that the entrance temperature of this gas is 60 degrees Fahr. The amount of electrical energy required to raise the temperature of this quantity of gas two degrees is known, and the meter is so adjusted that the requisite number of watts will be supplied to the heater installed in the meter casing. So long as the flow of gas remains unchanged the watts input will continue the same, but if more gas flows the meter will be called on to supply more watts and, conversely, if the flow of gas decreases the watts input will also decrease. Hence, what the meter really does is to meaasure the watts input, which can be easily done with great accuracy, and since the relation between a certain watts input and a certain flow of gas is known, it is possible to tell at any time the amount of gas flowing by merely noting the watts input. As a matter of fact, the recording mechanism of the meter translates watts input into standard cubic feet of gas, giving a direct reading without calculation of any kind, but the principle of the meter is as described.

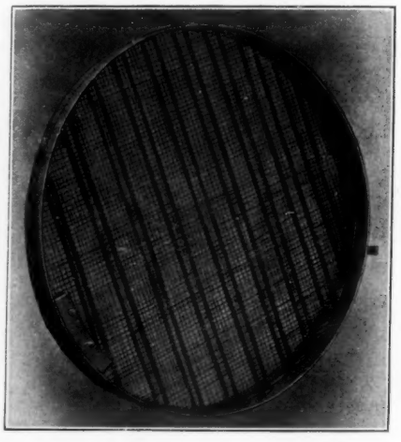


FIG. 2—SCREEN OF RESISTANCE WIRE WHICH FORMS THE THERMOMETER.

The fixed difference of temperature is maintained by the action of a device made upon the same general principle as the well-known autographic temperature recorders used in connection with resistance thermometers. It operates so

as to change the energy input to the heater according to the difference in electrical resistance between the two thermometers, this difference in resistance depending on the extent to which the gas leaving the meter through the outlet thermometer has been raised in temperature. As soon as the difference in resistance becomes greater or less than that corresponding to the desired two degrees temperature difference, the controller causes the operation of a small rheostat, the movement of which restores the balance between the thermometer resistances, this balance being attained only when the temperature difference has become two degrees. Thus, as the rate of flow of gas is increased, the temperature difference tends to decrease, and at once additional energy is introduced sufficient to heat the increased weight of gas so as to maintain the constant temperature difference of two degrees.

Controlling Device.

Fig. 7 is a diagram of the complete meter. The controller, *G*, is in effect a galvanometer and Wheatstone bridge combined. The movable member *Y* is caused to swing to the left or right of the position, *O*, according as the difference in resistance of the thermometers is greater or less than that corresponding to the desired temperature difference of two degrees between inlet and outlet of the meter. The ⅛ horsepower motor,

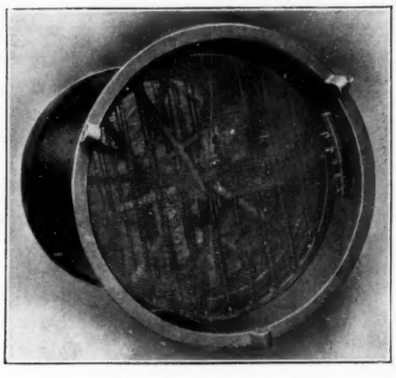


FIG. 3—METER CASING THROUGH WHICH THE GAS FLOWS

D, operates continuously, and by means of a crank, *F*, causes the bar, *B*, to move up and down, clamping the needle, *Y*, at the top of the stroke. It also drives at a slow, but constant speed a contact drum, *Z*, and two eccentrics, *S*, which give the rheostat pawls, *P*, a reciprocating vertical motion through a small arc along the edge of a toothed wheel, *R*, on the rheostat shaft. On the drum, *Z*, are three segments, J_1, J_2 and J_3, of different lengths, corresponding to one, two and three teeth on the wheel, *R*. If *Y* is clamped in position *1* on the right of the zero position, the pawl is engaged at such a time in its stroke as to increase the heater energy by one step on the rheostat. If *Y* is clamped in position *1* on the left of the zero posi-

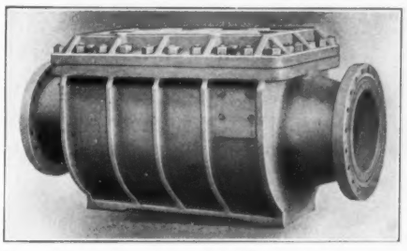


FIG. 4—METER CASING IN WHICH THE HEATER AND THERMOMETER ARE MOUNTED

tion, the heater energy is decreased by one step. If it is clamped in position *3* to the right or the left of the zero position the heater energy is increased or decreased by three steps, etc. In any case *Y* is returned toward the zero point, *O*, and the change in heater energy is continued until the proper point is reached. If *Y* is clamped in the zero position the rheostat is not moved.

The watt-meter in the upper left hand corner of the switchboard shows the energy which has been required to maintain the constant difference of temperature, and if desired a graphical watt-meter may be used to show the variation in gas flow. The dials of the integrating watt-meter are, of course, so arranged that they register the total cubic feet of gas or air passing the meter. The switchboard and recording mechanism can be placed in any convenient position, as, for instance, in an office instead of near the meter, thus permitting the records made to be continually observable in a convenient location.

The accuracy of the Thomas meter is not affected by changes in pressure of the gas or air, since the unit of measurement is that of weight rather than of volume. Also, variation of temperature of the incoming gas does not affect the accuracy of the meter, because it is a difference of temperature, rather than a fixed temperature, upon which the measurement depends. The meter can, therefore, be used for gas or air at either high or low pressure, and at either high or low temperature, provided the materials used in construction are adapted to the conditions.

The meter is especially well adapted for measuring the discharge of gas or air from compressors, blowers, etc., because the small and rapid periodic fluctuations of pressure, due to either suction or discharge conditions, do not interfere with the steady action of the thermometers. The time lag of the latter is sufficient to smooth out the curve of watts input or of temperature variation, as the case may be, and true average results are thus indicated. The fact that the meter is capable of accurately measuring gas under varying pressures and temperatures makes it especially valuable for measuring natural gas, as well as compressed air. The electrical energy required to operate the meter is approximately 1 kilowatt per 75,000 cubic feet of gas measured per hour, at atmospheric pressure.

A certain amount of water vapor forms part of almost all gases, including atmospheric air. The curves in Fig. 8 show the weight of water vapor in air at different temperatures and at 100 per cent humidity. This can be expressed as a percentage of the total weight of air and vapor. Thus at 60 degrees Fahr., 30 inches barometric pressure and 100 per cent humidity, the weight of a cubic foot of air and

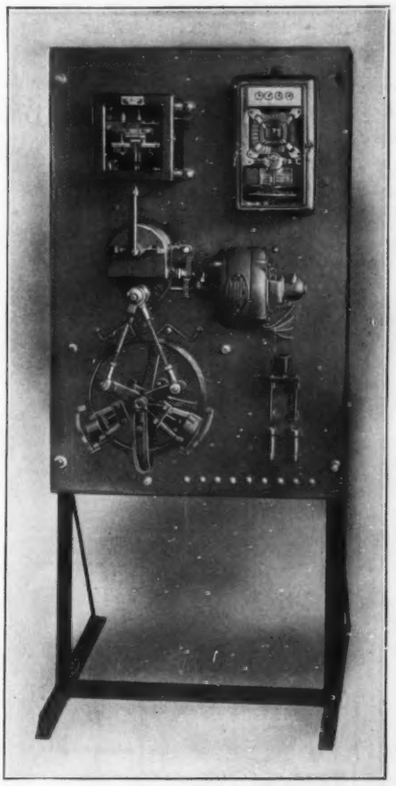


FIG. 5—SWITCHBOARD AND RECORDING MECHANISM OF THE THOMAS METER

vapor is 533 grains, and from the lower curve it is seen that it is possible, under saturated conditions, for the cubic foot of space to hold 5.6 grains of water vapor. The water vapor might then, at 100 per cent

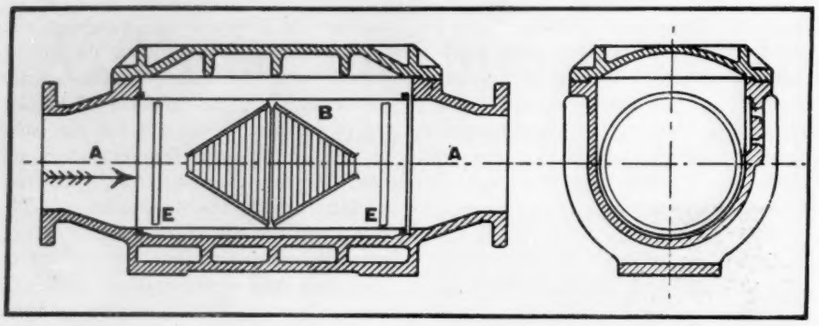


FIG. 6—DIAGRAMMATIC VIEW OF METER CASING WITH HEATER AND THERMOMETER IN PLACE

humidity, amount to 1.05 per cent of the weight of the air, and as the specific heat of water vapor is approximately twice that of air, the correction required due to fully saturated water vapor would amount to about 1 per cent. This correction can be readily made if desired, on the basis of either an assumed or an ascertained humidity. This is rarely 100 per cent, the normal relative humidity being more nearly 50 per cent, and the correction, therefore, about one-half of 1 per cent.

The Thomas meter is essentially applicable to the measurement of gas or air which is either dry, saturated, or superheated. If water is carried along mechanically as a fog or mist, the evaporation of this by the meter itself, of course, interferes with making accurate measurements. But such fog or mist can readily be transformed into dry vapor by the introduction of heat from a small radiator, consisting of a coil of pipe in the entrance to the meter. Steam is usually available, and can be introduced at about atmospheric pressure, or above, as may be most convenient.

BLAST FURNACE GAS.

	Volume, Cubic foot,	Weight, cubic foot,	Total weight, pound.	Specific heat per pound.	Specific heat, per cubic foot.
N_2	0.60	0.0743	0.0446	0.244	0.0109
CO	0.24	0.0741	0.0178	0.245	0.0044
CO_2	0.12	0.1164	0.0140	0.216	0.0030
H_2	0.02	0.0053	0.0001	3.409	0.0003
C_2H_4	0.02	0.0741	0.0015	0.404	0.0006
					0.0192

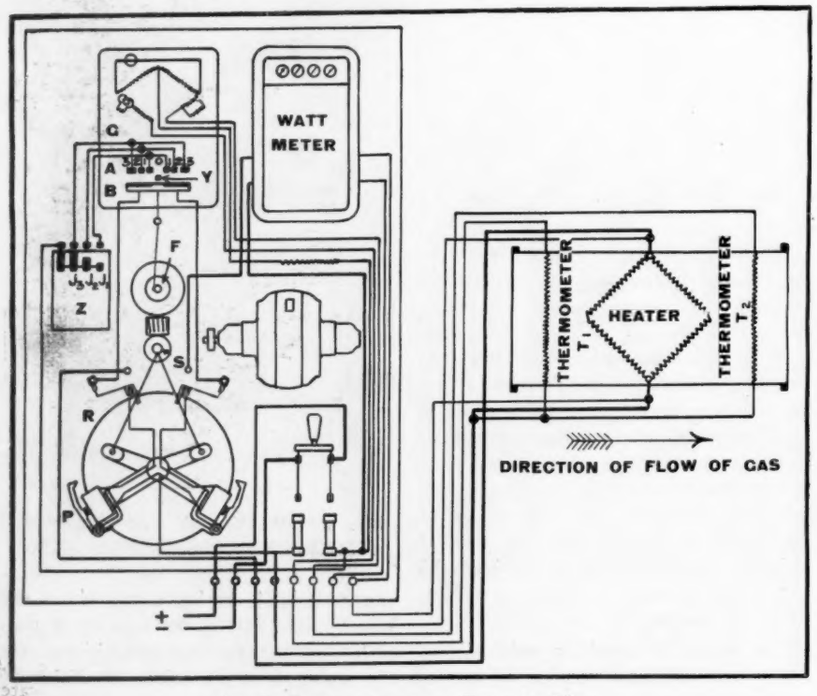


FIG. 7—DIAGRAM OF THE THOMAS METER

Extensive experimental work was done in the most thorough manner during the development of the meter. For the purpose of calibration the Thomas electric meter was placed in series with the large *wet* meter. The latter had been carefully put in order and calibrated before these tests, and when operated at loads within its capacity the readings were entirely reliable. The degree of success which has been attained with the electric meter is due principally to an extensive experience in this particular class of work, which has served as a guide in the development of satisfactory details. The resistance screens serving as thermometers make it possible to take account of exceedingly minute changes in temperature and the fact that the air or gas is heated only two

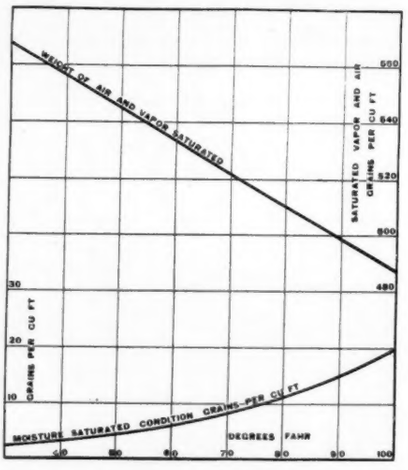

WEIGHT OF AIR AND VAPOR SATURATED
SATURATED VAPOR AND AIR GRAINS PER CU FT
GRAINS PER CU FT
MOISTURE SATURATED CONDITION GRAINS PER CU FT
DEGREES FAHR

FIG. 8—CURVES, SHOWING WEIGHT OF WATER VAPOR IN AIR AT DIFFERENT TEMPERATURES AND AT 100 PER CENT HUMIDITY

degrees Fahrenheit and is passing with considerable velocity, causes the heat losses to be so small as to be entirely negligible.

The specific heat of a given kind of gas appears to be very nearly constant, since those constituents which vary from time to time are not those which have most influence in affecting the value of the specific heat. The specific heat of blast furnace gas is practically the same as that of atmospheric air, and the same is true in a general way regarding producer gas. Thus, taking the accompanying table as an average analysis of blast furnace gas, the specific heat is found to be 0.0192, while atmospheric air has a specific heat almost identical with this, or approximately 0.0191 per cubic foot. This is to be expected, since producer gas and blast furnace gas consist principally of nitrogen and carbon monoxide.

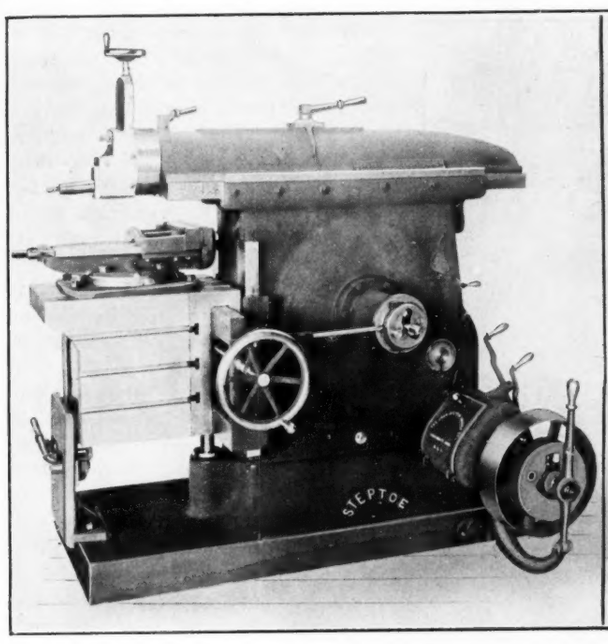


FIG. 1—TWENTY-FOUR-INCH BACK-GEARED CRANK SHAPER WITH SPEED BOX AND CLUTCH PULLEY

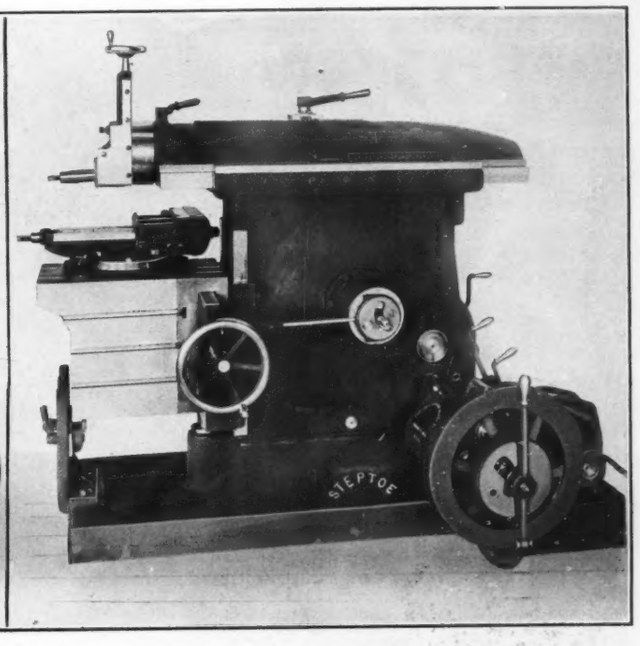


FIG. 2—TWENTY-FOUR-INCH BACK-GEARED CRANK SHAPER WITH SPEED BOX, MOTOR-DRIVEN

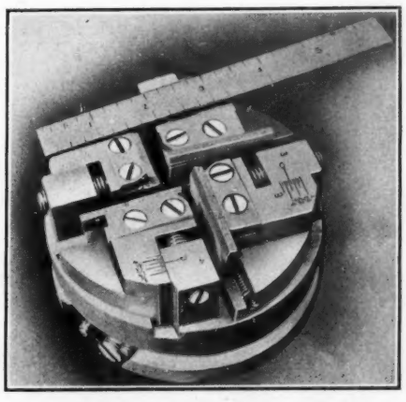
Motor Drive and Speed Box

The accompanying illustrations show a motor drive and speed box for driving a shaper designed by the John Steptoe Shaper Co., Cincinnati. The drive is very simple, consisting of a small gear on the motor with a large gear on the speed box shaft. Four changes of speed are secured through the speed box, and by means of the back gears, eight changes are obtained. All of the clutch mechanism is fully enclosed, thus avoiding the possibility of the operator being accidentally injured. The box is supported by a heavy brace projecting from the base of the shaper.

The machine is controlled by a clutch operating in the hub of the large gear. One pound pressure on the clutch lever gives 128 pounds pressure on the ring. It can be operated with little effort by the operator's right hand. All bearings in the speed box are equipped with ring oilers which flood the shaft with oil, while spiral oil channels in the shaft distribute the oil over the entire bearing. There are no clutches nor idle gears on the shaft in the speed box, avoiding noise or unnecessary wear when running idle, as all gears are keyed to the shaft and are wearing only when in use. When one gear is shifted into mesh the other is shifted out, giving an effective drive with minimum wear.

The driving shaft is relieved of all strain from the speed box by a large bushing that is entered where the driving shaft, from the shaper, enters the box. Ring oilers that can be replaced are used in this bushing and on the intermediate shaft, both in the column of the shaper and in the speed box.

The speed box can be used either with a clutch pulley or with a direct-connected geared motor, mounted on a sub-base cast into the base of the shaper, giving the motor a solid foundation and avoiding shaking and chatter marks on the work being planed. A General Electric Co. 3-horsepower, constant speed motor, running at 1,200 revolutions per minute is used with a 24-inch back-geared crank shaper.



SOLID, ADJUSTABLE DIE HEAD

Solid, Adjustable Die Head

In the accompanying illustration is shown a solid, adjustable die head manufactured by the Landis Machine Co., Waynesboro, Pa. This die head is intended to take the place of solid dies now used on screw and other types of machines on which the work is backed out of the die after the thread is cut. The die head shown has a range of from ¼ to 1 inch. The dies are adjusted to and from the center on radial lines for different sizes and are held rigidly in their seats. The die head is held in the turret of any ordinary screw machine and trips off by retarding the forward movement of the carriage. This die head is also made without the tripping device for special requirements. The tripping arrangement is so designed that when the desired length of thread is cut, the die head will trip and revolve with the work until the machine has time to reverse. Using this head, high cutting speeds can be attained equal to the turning and drilling speeds of other operations on screw machines.

The dies are made of high speed steel and can be frequently reground without being annealed or retempered. One set of chasers can readily be set above or below their rated diameter. For instance, ½-inch (13 thread) chasers can be set to cut 1 inch diameter when desired or ¼ inch diameter if necessary. While the angle of the

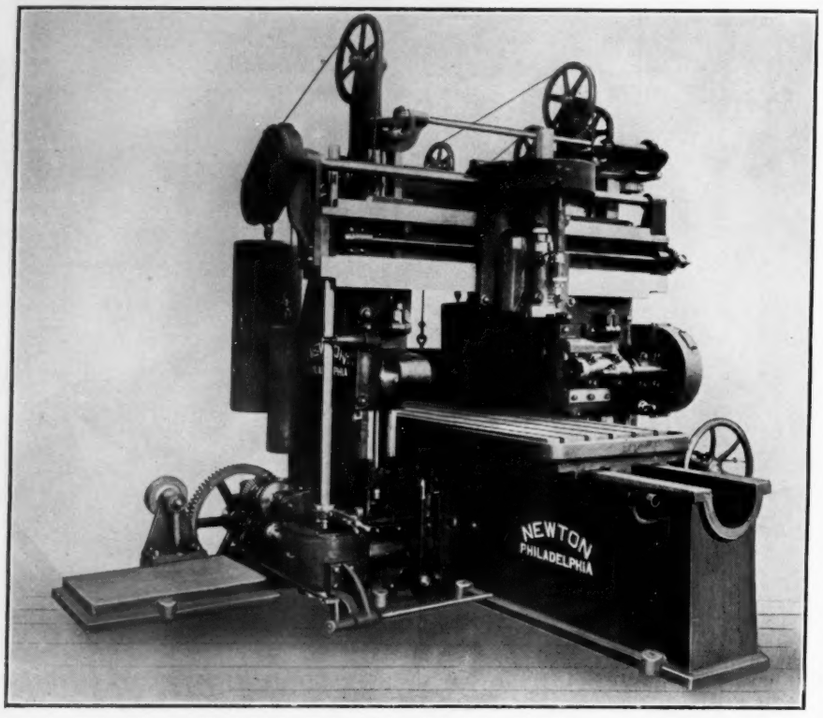


FIG. 1—NEWTON VERTICAL AND HORIZONTAL SPINDLE MILLING MACHINE

thread will not be true, nevertheless it will be satisfactory for ordinary screw machine work. With this head any diameter within its range can be cut with one set of dies, as long as the pitch is the same. If an absolutely correct pitch is required, however, it is advisable to use special holders so that the chasers can be set on an exact angle to correspond with the angle of the thread. These heads are made in standard sizes with shanks suitable for holders in ordinary screw machines. The ½ inch head is 2¾ inches in diameter and will cut a thread 1½ inches long. The 1-inch head is 4⅝ inches in diameter and will cut a thread 2½ inches long.

Vertical and Horizontal Spindle Milling Machines

In Figs. 1 and 2 is shown a vertical and horizontal spindle milling machine built by the Newton Machine Tool Works, Inc., Philadelphia. This machine is adapted for a wide variety of work, particularly in railroad shops, not only on account of the convenient location and the small number of operating levers, but, in addition, one transmission serves all the moving parts. The diameter of the spindles in the adjustable saddles is 4 inches; in the sleeve of the driving worm, 3⅝ inches, and the diameter of the spindle driving the worm wheel is 19 inches. The maximum distance between the uprights is 45 inches; maximum height under vertical spindle, 25 inches; maximum height from the center of the horizontal spindle to the top of the work table, 17 inches, and the maximum distance between the horizontal spindle and the opposite upright is 36 inches. Both spindles are of the same design and revolve in bronze-bushed bearings in the saddles. They have a vertical hand adjustment with micrometer measuring guides, and are driven by sleeve worm wheels by means of double splines. The driving worm wheel is made of hardened steel, fitted with roller thrust bearings, which are encased and run in oil, with special provision to prevent its escape, the flange being cast solid with the saddles and extending 2 inches beyond the hub on the driving worm. The driving spline shafts are fitted with bushings that revolve with them, thereby preventing the escape of oil through the splines.

The adjustment of the spindle saddles is made by means of taper shoes and the stresses are thus confined to the edge of one shear for each surface. The cross-rail is of box type construction, is counter-weighted and has a reversing, power-operated, vertical adjustment and feed with nine changes. The alignment is maintained by a bearing on both sides. On the right hand upright the elevating screws have a top and bottom bearing to permit of keeping them in tension at all times and as the counterweights are heavier than the rail, all lost motion is eliminated.

The horizontal spindle saddle and outboard bearings are counter-weight-

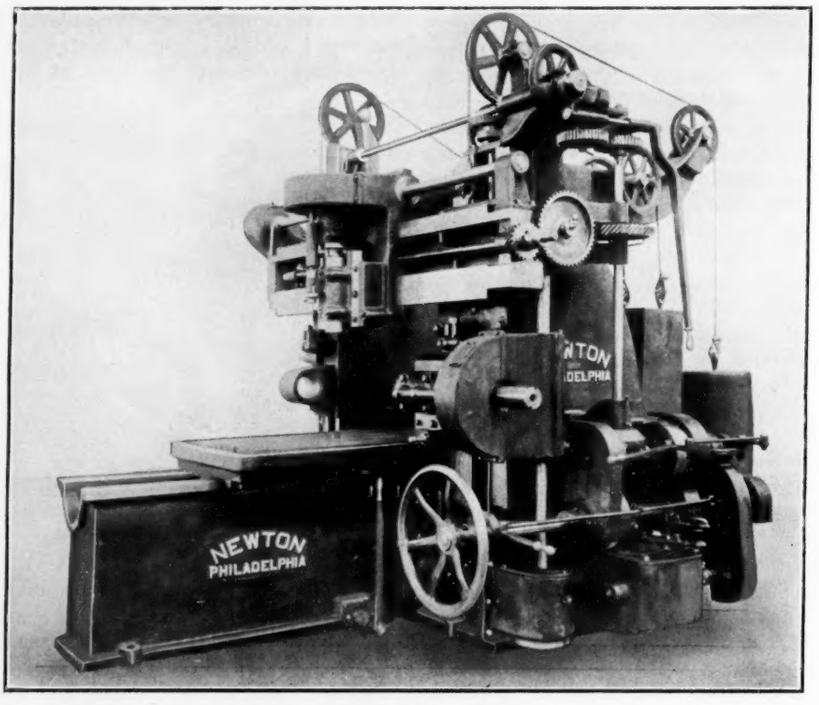


FIG. 2—ANOTHER VIEW OF THE NEWTON VERTICAL AND HORIZONTAL SPINDLE MILLING MACHINE, SHOWING THE FEED AND SPEED BOX

ed, have a hand vertical adjustment by means of a rack placed on the front of the uprights and the adjacent faces of the spindle saddle and outerbearing and of the rail are finished, permitting of their attachment to maintain alignment when using an arbor in a horizontal spindle, or for their elevation by power in unison with the rail.

Power for driving the machine is transmitted from a motor which is mounted on the pad shown at the left, Fig. 1. Clutched drive is provided for the vertical spindle and by this means either of the spindles can be operated independently or in unison, as desired. Power for the feed and fast power traverse is transmitted by a double train of bevel gears to the feed and speed box, shown in Fig. 2. The drive for the vertical spindle can be engaged or disengaged from either side of the machine. The table has square, locked gibbed bearings on the base, and the drive is by means of an angular rack and spiral pinion. There are nine changes of reversing gear feed, reversing fast power traverse and hand adjustment. The one feed and fast power transmission serve for operating the table for the elevation of the rail and for imparting the reversing feed and fast power traverse to the vertical spindle on the cross-rail.

The machine has an overall length of 9 feet and is 11 feet wide over the motor brackets and extending levers. The rack is made of steel and the pinion of bronze. The motor has a speed of 440 to 1,400 revolutions per minute, imparting spindle speeds to the horizontal spindle of 13.73 and 43.70 revolutions per minute and to the vertical spindle, speeds from 11.11 to 35.61 revolutions per minute; the feeds of the table per revolution of vertical spindle are 0.0349 and 0.3615 inch and to the horizontal spindle from 0.0285 to 0.2945 inch; the table feeds per minute range from 0.3915 to 4.05 inches on the slow speed of the motor and from 1.245 to 12.90 inches on high speed; the quick movement of the table is 66.25 inches on the slow speed of the motor and 17 feet, 0.7 inch on the high speed; the quick movement per revolution of horizontal spindle is 4.82 inches and per revolution of vertical spindle is 5.91 inches; the cross-feed to the vertical head on the rail per revolution is from 0.0392 to 0.406 inch; the down feed of the rail is from 0.0468 to 0.485 inch per revolution of the vertical spindle. The machine is so designed that the side head can be placed on either the right or left upright or one on each upright and either one or two on the cross-rail. This machine weights 30,000 pounds.

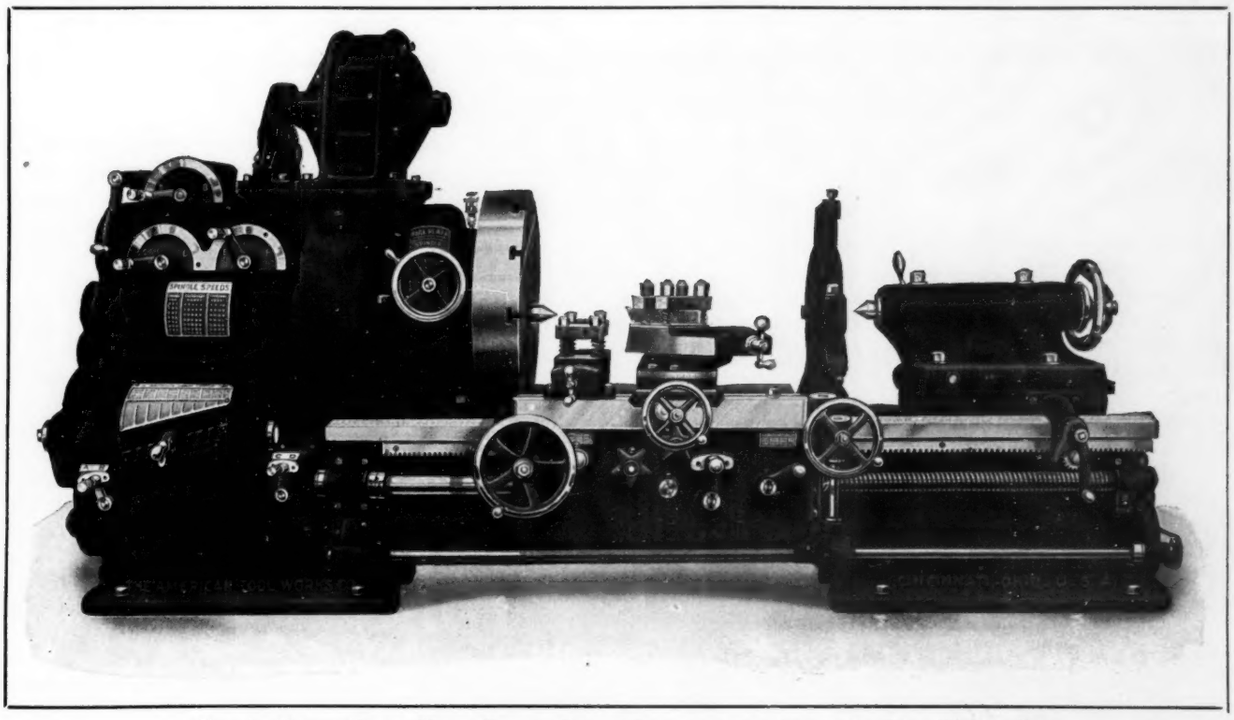


FIG. 1—HEAVY DUTY, MOTOR-DRIVEN LATHE BUILT BY THE AMERICAN TOOL WORKS CO.

The Standard Foundry Co., Detroit, has increased its capital from $40,000 to $100,000.

Heavy Duty Lathes

The heavy duty, 36-inch and 42-inch lathes, built by the American Tool Works Co., Cincinnati, are arranged either for belt and motor drives, the latter being shown in Fig. 1. One of the features of these lathes is the quick - change gear mechanism, which provides 48 changes for feeding and screw-cutting, as shown on the index plate, illustrated herewith. The range of threads is from ½ to 28 threads per inch, including 11½ pipe threads, with four to 224 cuts per inch. There are 32 fundamental changes for feeding and screw-cutting in the quick-change unit, producing threads from one to 14 per inch and feeds from eight to 112, without changing a gear.

The fundamental changes in the box are supplemented by an additional range of eight coarser threads from ½ to 1 thread per inch and eight finer threads from 14 to 28 threads per inch. with corresponding additional feed changes through an auxiliary quadrant with compound gears on one end of the bed.

The feed box is a complete unit, and consists of a gear box on front of the bed with two levers and a steel sliding tumbler, the latter working in conjunction with a cone of eight steel gears. The clutches are of the selective type, making engagement practically instantaneous. An important feature of this unit is the arrange-

ment of gears so that coarse threads and feeds are all secured with direct drive, thereby eliminating all superfluous speed changing gears. At no time does any "speeding-up" occur in the gear box unit. Index plates are in full view of the operator on front of the gear box, showing the exact setting for each thread or feed. It is frequently necessary to cut odd threads and to provide for this feature the feed mechanism is supplemented by a quadrant on the end of the bed load. The rack pinion can be withdrawn from the feed rack when screw-cutting. A non-interfering device is provided, making it impossible to simultaneously engage the feeding and screw-cutting mechanism.

The compound rest is of heavy construction and the top and bottom slides are fitted with full-length taper gibs, having end-screw adjustment, thus providing continuous, accurate bearings. The top slide has a 14-inch power, angular feed, micrometer adtionally heavy and thoroughly braced by cross-box girths at short intervals throughout its entire length. The bed is of "V" design, which affords additional swing and permits of an exceptionally deep carriage bed. The bed is further strengthened by a web cast through the center which carries a rack for engaging the pawl support from the tailstock. The wall at the tailstock end is cut out to permit of slipping the tailstock off without removing the bolts. The gear box and lead

Gears on. Stud.	Box.	Thrds.	Feeds.	Thrds.	Feeds.	Thrds.	Feeds.	Thrds.	Feeds.	Thrds.	Feeds.	Thrds.	Feeds.	Thrds.	Feeds.	Thrds.	Feeds.	Handles.
64	32	½	4	..	4½	5/8	5	..	5½	..	5¾	¾	6	..	6½	⅞	7	B C
32	32	1	8	1⅛	9	1¼	10	1⅜	11	1⅝	11½	1½	12	1⅝	13	1¾	14	B C
		2	16	2¼	18	2½	20	2¾	22	2⅞	23	3	24	3¼	26	3½	28	A C
		4	32	4½	36	5	40	5½	44	5¾	46	6	48	6½	52	7	56	B D
		8	64	9	72	10	80	11	88	11½	92	12	96	13	104	14	112	A D
32	64	16	128	18	144	20	160	22	176	23	184	24	192	26	208	28	224	A L

FIG. 2—INDEX PLATE, SHOWING CLEARLY HOW TO OPERATE EACH THREAD AND FEED

which permits of securing threads and feeds not ordinarily obtained through the gear box.

The lead screw is of extra large diameter and is chased one thread per inch, permitting of the engagement of half nuts at any point without the use of a thread dial, except when fractional threads are desired. The triple gears are of the slip-gear type, readily engaged by rack and pinion at the front of the head, by the manipulation of the hand wheel. The internal gear is planed integral with the face plate and the pinion is cut solid with the steel shaft. All of the gears are coarse pitch and wide face. The spindle is made of high carbon steel and has an opening 2⅝ inches in diameter, its entire length. The spindle is without loose gears, of taper construction and large diameter, which insures the greatest rigidity and power.

The carriage has a continuous bearing of 50½ inches on the "V's" and additional bearings on top and on the inner surface of the front tailstock "V", which resists the forward thrust of the tailstock and affords a bearing directly underneath it. The carriage is gibbed its full length on the back and a clamp is provided on each end at the front. The apron is tongued and grooved, and is bolted to the carriage, extending its entire length. Both longitudinal and cross-feeds are reversed by a lever from the front of the apron and not at the headstock. This feature is of special value on long beds, where the operator is at some distance from the head. The cross-feed is positive and can be instantly released under the heaviest

justment and is equipped with a four-stud tool holder and two hardened steel clamps, the studs being so placed that the tool may be set outside of the same, either crosswise or lengthwise. The tailstock is of massive proportions with continuous bearings on the ways and is moved along the bed by a crank and gear. It is of the quadruple clamping stud type with studs running to the top of the barrel, and is firmly secured against movement by a pawl dropped from the engaging rack, cast in the center of the bed, which is of value when doing heavy work, as the pawl can be lifted out of engagement by a pull-rod

Handles on.	Spindle, revolutions per minute.	Face plate, revolutions per minute.
A D E	250	19
B D E	180	14
A C E	130	10
B C E	95	7
A D F	70	5½
B D F	50	4
A C F	36	2¾
B C F	26	2

FIG. 3—INDEX PLATE, SHOWING POSITION OF LEVERS FOR SECURING DIFFERENT SPINDLE SPEEDS

on the end of the tailstock. The tailstock barrel is solid, of large diameter, and is equipped with an improved form of plug binder for clamping the spindle. The spindle has an exceptionally long travel and is actuated by a dished hand wheel which brings the rim closer to the operator. When the spindle is extended, it is given extra support by a projecting nose on the tailstock.

The bed is of deep section, except-

screw bearing are seated with a tongue and groove fit, thereby securing accurate and permanent alignment.

The motor-driven lathe has a constant speed motor, either of the direct or alternating current type, located on top of the geared head and connects with the main driving shaft, through spur gearing. Sixteen fundamental spindle speeds are obtainable, and the motor is under constant control through the controller handle, which is conveniently lcated on one side of the carriage. The fundamental speed changes are made through the manipulation of the levers on the front of the headstock and a friction clutch is provided on the driving gear for starting, stopping or slightly moving the gears in the head to facilitate making speed changes without shock or interfering with the motor speed.

The headstock of the lathe arranged for single pulley belt drive is of the triple-geared type and is identical with that used for the motor drive. For a cone pulley drive the headstock is built with triple gears and furnishes 12 spindle speeds. The cone pulley has four steps, 5 15/16 inches face. The standard length of the bed of these lathes is 12 feet. The swing over the bed of the 42-inch lathe is 44 inches and over the carriage 30⅝ inches. The swing over the bed of the 36-inch lathe is 37¾ inches and over the carriage 23⅜ inches.

The Automatic Tubing Co., Menominee, Mich., whose incorporation was noted recently, advises that it does not contemplate building at present.

A Model Mono-Rail Coal Hoist Installation

How a Saving of $200 Per Month Was Effected by the Equipment of a Power Plant with a Mono-Rail Hoist

As the average coal consumption of the power plant of the Kalamazoo Paper Co., Kalamazoo, Mich., averages 35 tons per day, the problem of handling this amount of fuel with the facilities provided, was very expensive, as it required a large amount of hand labor. As shown in Fig. 3, the boiler house is equipped with eight vertical boilers installed on one side of the plant. On the opposite side and adjoining the boiler house is a coal shed in which the level of the tracks is about 8 feet above the level of the firing floor in the boiler room. The coal is dumped into pockets, part of it falling through the arches in the wall between the coal shed and the boiler room, as shown in Fig. 1. From these piles the coal was originally handled by a small electric traveling crane provided with scoop buckets. To a large extent it was necessary to shovel the coal into these buckets by hand and the buckets were subsequently hoisted across the fire room floor and their contents dumped into the stoker hoppers shown in Fig. 1.

To eliminate the cost of this hand labor, mono-rail grab hoists, provided with 1¼-yard, Williams, two-rope buckets were installed by the Cleveland Crane & Engineering Co., Wickliffe, O. The buckets were arranged, as shown in Fig. 3, with hand-operating switches contolled by the operator of the hoist from his position in the cage. These switches are also fitted with automatic stops so that it is impossible for the hoist to run off the end of the rail when the switch is not in position. This arrangement permitted of the installation of a system of four tracks, one passing over the railroad track, as shown in Fig. 3, another extending over the dumping pits outside of the boiler room, a third commanding the pit adjacent to the boiler room wall and the fourth passing over the stoker hoppers. This arrangement makes it possible to take the coal either direct from the car, from the dumping pit in the coal shed, or from the pit in the boiler room and to convey it direct to the stoker hoppers. The hoist installed, as clearly shown in Fig. 2, is equipped with one drum for the closing line and one for the hoisting line, operated by the same motor through friction clutches controlled from the operator's cage. The lowering of the bucket, as well as operating and closing, are effected by gravity. After the bucket has been lowered to the stock pile or car, and is closed, the clutch for the holding drum is engaged and both drums are utilized for lifting the load. With the gravity fall any speed of lowering can be obtained, as the motor is inoperative when the bucket is being lowered or opened. When the bucket has reached its highest position, it is sustained by a self-lubricating mechanical brake of the double friction type, thus eliminating the constant attention of the operator and preventing the dropping of the bucket in case he is interrupted in his work. To relieve the hoisting clutches of undue wear in lowering the bucket, the hoisting drums are provided with band brakes controlled by a foot lever from the operator's cage. The friction clutches used for raising the load act as safety devices in case of overhoisting, since the clutches are so designed that they will slip before the stresses in the hoist ropes have reached the danger point.

The machine is also equipped with four-wheel swivel trucks, which operate on the bottom flange of the I-beam, as shown in Fig. 2. The operation of the hoist along the runways is accomplished by a train of gears to the four wheels on one truck, the motor being attached direct to the swivel truck. This permits the operation of the machine around curves of short radius. This was one of the essential features of this installation, as it is necessary to make short turns at either

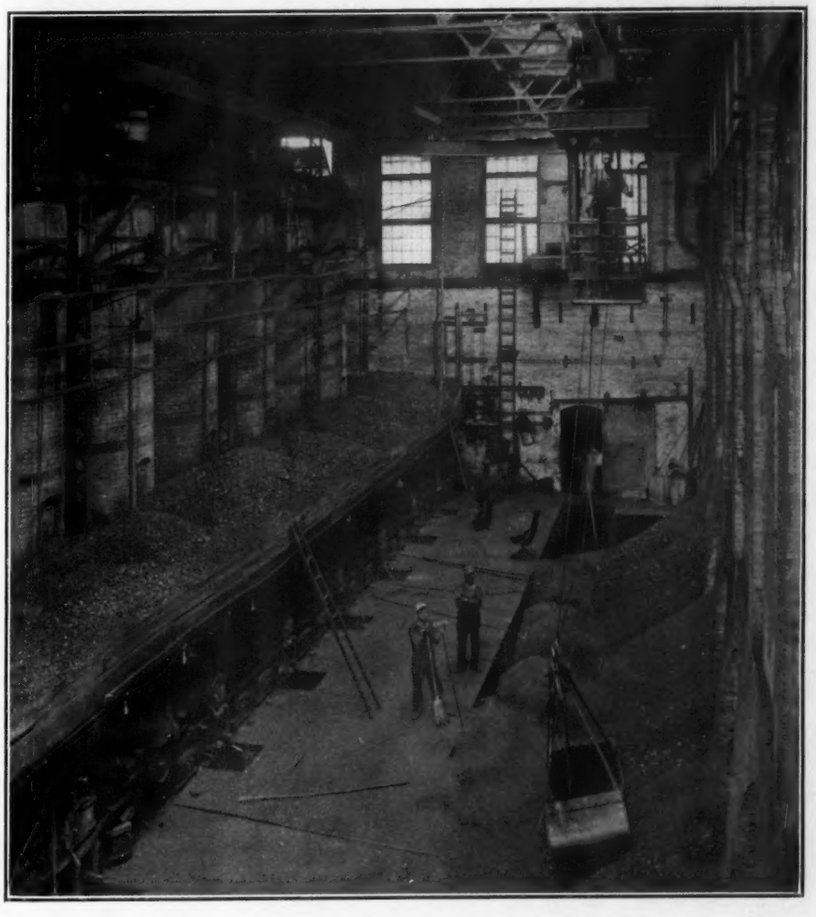


FIG. 1—BOILER ROOM OF KALAMAZOO PAPER CO., SHOWING MONO-RAIL GRAB BUCKET HOIST FOR DELIVERING COAL TO THE STOKERS

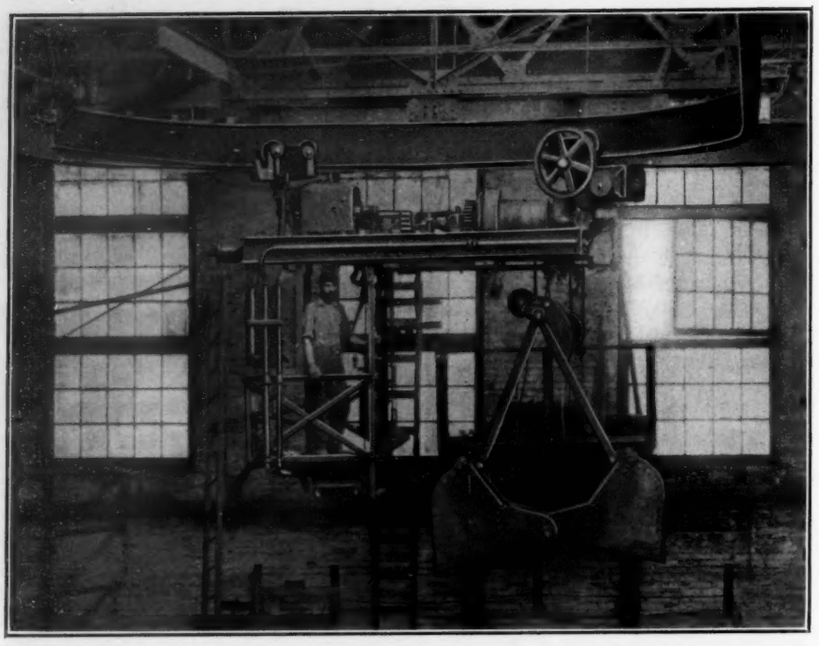


FIG. 2—THE MONO-RAIL GRAB BUCKET HOIST INSTALLED IN THE BOILER ROOM OF THE KALAMAZOO PAPER CO.

end of the boiler room to cross over from the coal pit to the stoker hoppers on the opposite side. The hoist installed is the Cleveland Crane & Engineering Co.'s standard, two-drum, mono-rail grab bucket type.

A General Electric hoisting motor is used, of 20-horsepower capacity, arranged for 220 volts, direct current. The rack motor has a capacity of 10 horsepower and is of the same type. The operator's cab is attached to the hoist and the controllers, switchboard, resistances, etc., are installed in the cage, convenient to the operator. The levers for operating the friction clutches and the foot levers for operating the lowering brakes are also in the cab within easy reach of the operator.

After the installation of this machine five stokers were discharged, thus reducing the cost of operating the power plant approximately $200 per month. Ashes are removed from the boilers in cars, which operate on tracks underneath the firing room, the cars being pushed to one end of the building and the ashes are dumped at a point where they can be conveniently loaded into cars by the grab bucket. By this installation the cost of handling the coal is not only reduced, but the handling of the ashes is also facilitated.

Kirk & Blum, Cincinnati, Pioneer and Culvert streets, are building a new plant, 40 x 170 feet, two stories high. They will require machinery for cutting, punching, seaming and forming galvanized steel sheets, and will be glad to receive information concerning machinery used in manufacturing round and square ducts of large dimensions. This firm manufactures and contracts for installing shavings and dust collecting systems, also systems of heating and ventilation.

Vierling, McDowell & Co., Chicago, have changed their name to the Vierling Steel Works, and have increased their capital stock from $250,000 to $300,000.

Will Soon Ship Ferro-Vanadium

The Vanadium Mines Co., Pittsburg, incorporated some time ago with an Indiana charter, will make the first shipment of ferro-vanadium from its Rankin, Pa., plant about Mar. 15. The company owns 400 acres of land in New Mexico along the Santa Fe railroad. The mines produce a lead vanadate with 55 per cent lead sulphate and 9 per cent vanadium. The concentrate plant at the mines has a capacity of 150 tons a day, while the oxide plant at Cutter, 12 miles from the mine, which separates the lead sulphate from the vanadium ore, has a capacity of 12,000 pounds of lead sulphate a day and the vanadium ore that can be shipped from the oxide plant will be equal to between 1,500 and 2,000 pounds of pure vanadium a day. The company ships its lead sulphate direct from Cutter to consumers and ships its vanadium ore to Rankin, Pa., where it is made into ferro-vanadium.

The Pittsburg men interested in the new enterprise are, president, A. B. Bement; vice president and general manager, W. A. Bonitz; secretary, T. M. Bement; treasurer, C. R. Miller. A new process of abstracting the vanadium, designed by S. Diescher & Sons, Pittsburg engineers, is used by the new concern. General offices of the company are in the Frick annex, Pittsburg.

The Elkhart Brass Mfg. Co., Elkhart, Ind., has increased its capital stock from $25,000 to $60,000.

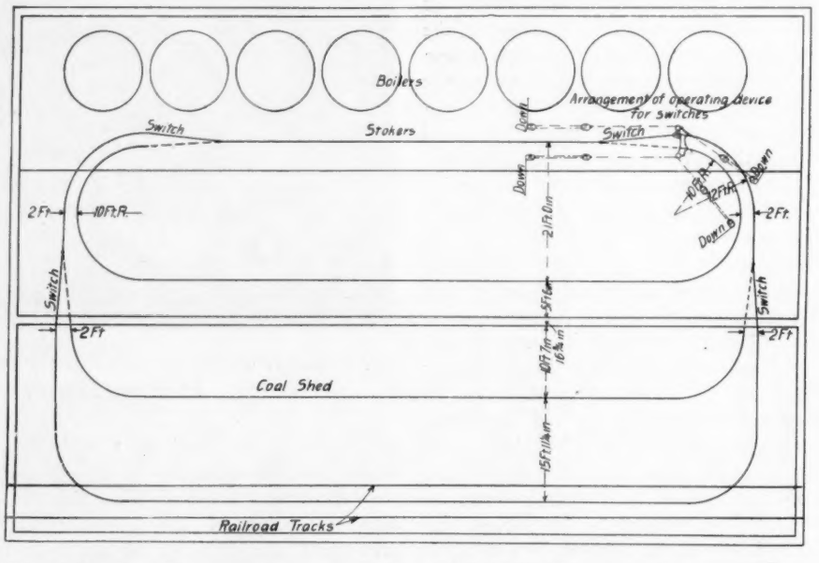


FIG. 3—GENERAL ARRANGEMENT OF THE MONO-RAIL HOIST INSTALLATION IN THE KALAMAZOO PAPER CO.'S PLANT, WHICH COMMANDS THE BOILER HOUSE, THE COAL SHED AND COAL RECEIVING TRACK, AND NOT ONLY FACILITATES THE HANDLING OF THE COAL BUT THE ASHES AS WELL

Rockford Vertical Milling Machine

In the accompanying illustration is shown a vertical milling machine built by the Rockford Machine Tool Co., Rockford, Ill., on which the adjustable knee has been eliminated. It will be noted in Fig. 1 that the column and the horizontal slide for the saddle are cast integral and by this construction the table is not adjustable vertically. However, the top of the table is only 30 inches from the floor, a convenient height for the operator when handling castings or other parts that are to be machined. The head bearing on the column is as large as the bearing to the knee on another machine of corresponding size, while the weight of the head is less, and, in addition, the head is counter-balanced, relieving the bearing of the overhang.

The general dimensions of the machine are as follows: Distance from the spindle to the column, 15 inches; total length of table, 56 inches; working surface of the table, 14½ x 48 inches; maximum distance of table to spindle, 24 inches; minimum distance of table to spindle, 3 inches. The head has a vertical movement of 21 inches and a bearing on the column, 19 inches wide and 25½ inches long. The spindle is 4 inches in diameter at taper and 3 inches at the upper end. It has an adjustment of 6 inches by means of a sleeve and worm gear. The spindle has 12 speeds, nine back-geared and three, high open-belt speeds for small cutters with 12 changes of feeds. The drive is through a three-step cone pulley, the diameters of the steps being 12, 13¾ and 15½ inches for a 4-inch belt. The speed of the countershaft is 390 revolutions per minute. Three speeds for each step of the cone pulley are obtained through the back gearing by the manipulation of the vertical levers at the side of the machine. Two levers are interlocking, preventing any two conflicting combination of gears being engaged at the same time. By placing the vertical lever in its neutral position, the sliding gears are locked out of mesh and by moving the lower of the two levers to the right the clutch is engaged with its mate, which is cut on the end of the shaft carrying the cone pulley, and the three high speeds are obtained direct from the cone to the bevel gears on the vertical shaft. The following 12 speeds are thus obtained to the spindle: 13, 16.6, 21.4, 27.4, 35.2, 45, 57.8, 74, 98.3, 121.6, 156 and 200 revolutions per minute.

A cross-section of the head, showing the construction of the driving gears and spindle, is shown in Fig. 4. The pinion is a crucible steel forging, the large gears are steel castings and the spindle is a crucible steel forging. The spindle gear has large bearings, which relieve the spindle of all side strains. Fig. 2 is a cross-section of the feed mechanism, showing its construction. It is driven by a spur gear from the back gear shaft. The clutch for engaging and reversing the feeds is placed on the upper shaft, which has the highest speed in the box. The lever for operating the clutch is conveniently placed in front of the machine. The power from the clutch shaft is transmitted through the slip gears at the end of the machine. Two pairs of these gears are used which are reversible, giving four changes. Three changes for each position of the slip gears are obtained by the sliding gears on the lower shaft, which are operated by the lever shown on the front of the feed box. The 12 feeds range from ¾ to 7 inches per minute and can be instantly applied to the table. The cross-movements of the saddle are on the head. The friction shown in the feed shaft, Fig. 2, has sufficient power to drive any feed, but not sufficient to break the feed gears or other parts in case the work being fed is stopped by some rigid obstruction, such as accidentally feeding the saddle against the column or the table nut against either end of the saddle.

The power-operating, quick-adjusting device of this vertical milling machine is shown in cross-section in Fig. 3. It is claimed by the builders of this tool that tests of a machine so equipped, as compared with a machine with hand movements, showed a substantial gain in the production in favor of the machine returning the table by power. The power is transmitted to a reversible clutch by spur gearing direct from the cone shaft. Transmission from the clutch shaft is through the angle shaft equipped with universal joints to the feed train in front of the machine. In Fig. 3 is shown the arrangement of the operating lever, which is conveniently placed in front of the machine. This lever is interlocking, making it impossible for the feed mechanism and the quick-return to be engaged at the same time. In this illustration the lever is in position with the power-operated, quick-adjusting clutch locked in neutral position and with the clutch on the feed shaft engaged. The lever is pivoted and engages the rod that passes through the shaft, which is connected to collar, *A*, by a key through a slot in the shaft. Shaft, *B*, which extends through the column, is connected by yokes on either

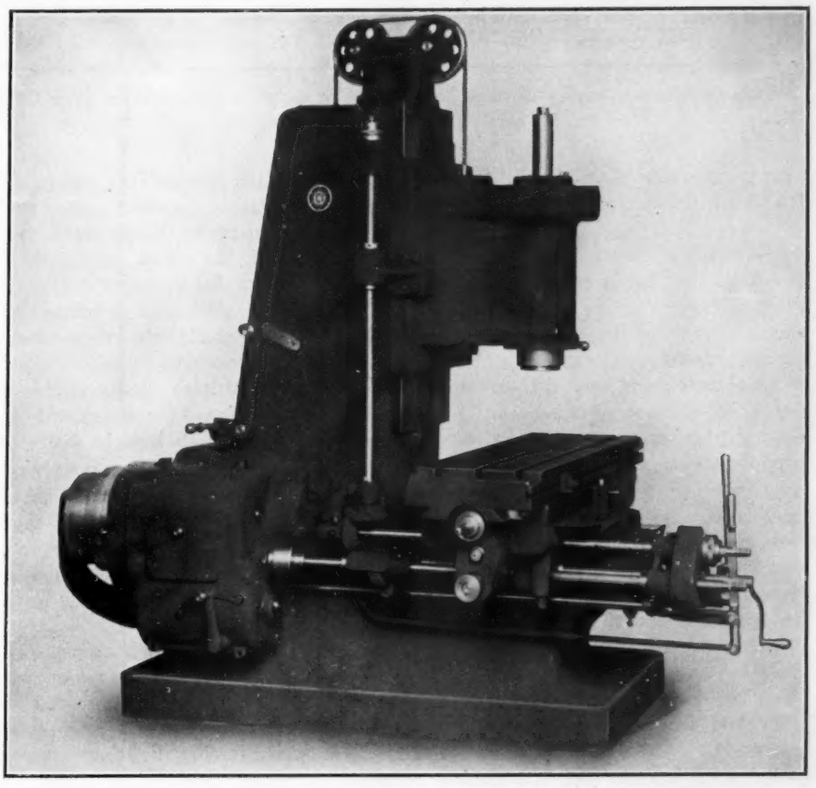


FIG. 1—VERTICAL MILLING MACHINE BUILT BY THE ROCKFORD MACHINE TOOL CO., ROCKFORD, ILL.

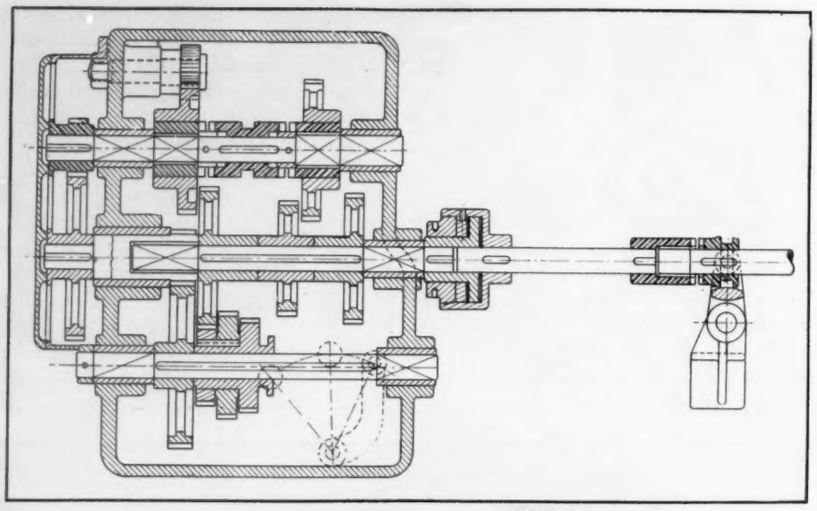


FIG. 2—CONSTRUCTION OF THE FEED MECHANISM WHICH IS DRIVEN BY A SPUR GEAR FROM THE BACK GEAR SHAFT

side to the sliding collar, *A*, and the jaw clutch on the feed shaft, *C*. It will be noted that an outward movement of the operating lever disengages the clutch, *C*, on the feed shaft and the lever is free to be moved to the right and left to pass the projection or the bearing castings, thus engaging the reversible clutch and applying power for the quick-adjusting mechanism. When making duplicate parts and with one operator constantly attending the machine, all movements can be controlled by this one lever, as it will be noted that by pressing the lever toward the machine the feed is again engaged. However, this does not interfere with the operation and the use of the automatic stops to the longitudinal and cross-movements.

All slides are fitted with adjustable taper and gibs which can be adjusted endwise to compensate for wear. The saddle slide is double-gibbed, having a taper gib on the inside of the right hand bearing, insuring perfect alignment when feeding under heavy cuts. All movements of the table, saddle, head and sleeve can be governed by graduated collars. All shaft bearings are provided with wool felt oil retainers and efficient means have been devised for oiling the driving shafts and feed box. All bearings are connected by soft brass tubes, 5/16 inch in diameter, which are brought up to a convenient location and grouped together in an oil cup with a hinged cover. Two of these are shown on top of the feed box, Fig. 1. The net weight of the machine is 6,800 pounds.

Tate, Jones & Co., Pittsburg, have issued a circular describing a portable, fuel oil burner of the compressed air type, which can be used for heating ladles, drying molds, lighting cupolas, etc.

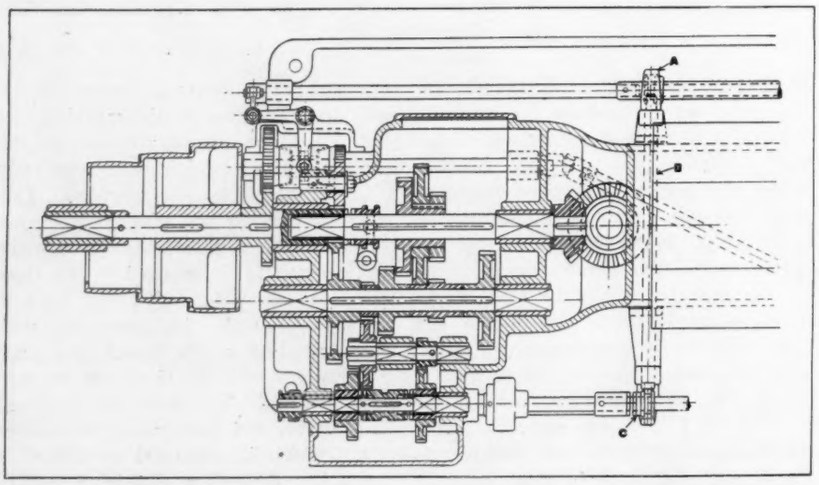


FIG. 3—CROSS-SECTION OF THE QUICK-ADJUSTING DEVICE WITH WHICH THE ROCKFORD VERTICAL MILLING MACHINE IS EQUIPPED

Mining Institute Proceedings

The published proceedings of the Lake Superior Mining Institute, of its fifteenth annual meeting on the Gogebic range, Michigan, Aug. 24, 25, 26, 1910, have just been issued by the secretary of the institute. They are contained in a 6 x 9-inch, 222-page volume. Besides containing the customary lists of officers, members, by-laws, etc., of the institute, the book includes the technical addresses delivered at the Gogebic range meeting. These are: "Underground Steel Construction", by R. B. Woodworth; "A Diamond Drill Core Section of the Mesabi Rocks", by N. H. Winchell; "The Proper Detonation of High Explosives", by Chares S. Hurter; "Underground Methods of Mining Used on the Gogebic Range", by Percival S. Williams; "The Company Surgeon", by E. M. Libby, M.D.; "Steel Head Frame, No. 4 Shaft, Montreal

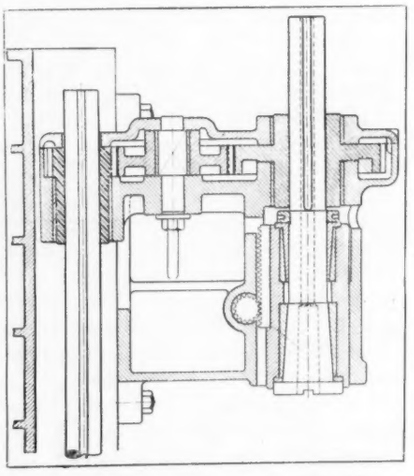
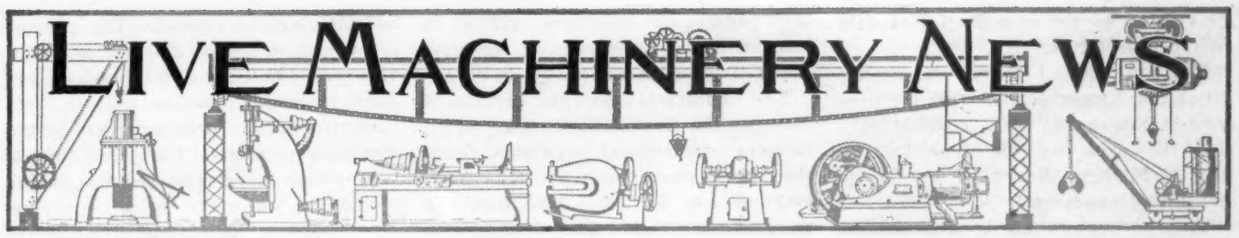


FIG. 4 — CROSS-SECTION OF THE HEAD, SHOWING THE CONSTRUCTION OF THE DRIVING GEAR AND SPINDLE

Mine", by Frank B. Goodman; "Biographical Notices", by J. H. Hearding. A map of the Gogebic range, a picture of the Joseph T. Ryerson plant in Chicago, and a picture of the city of Ironton, Mich., are contained in the volume.

The Chamber of Commerce and Manufacturers' Club of Buffalo, N. Y., has telegraphed Senator Depew and Senator Root, protesting against the resolution to extend for five years the Burton bill limiting the amount of electric power that may be imported from Canada. The senators are urged to oppose the bill on the ground that Buffalo's growth demands increased electric power. The organization asks for a hearing on the resolution.

LIVE MACHINERY NEWS



Reports from leading machinery centers last week indicated a slightly increasing volume of business. This was especially true of the east, where some important transactions were concluded. In the middle and far west, there is still a lack of large orders, although inquiries are more numerous. In New York, the most important event was the distribution of a large machine tool list by the M. H. Treadwell Co. among three eastern houses. The list recently submitted by the Simms Magneto Co., for its new plant in New Jersey, was greatly augmented by the addition of further specifications. It is expected that the Simms list will be awarded without delay. In Pittsburg, no definite action has yet been taken on proposed new construction work, although several new projects have been announced. In Cleveland and Chicago, similar conditions prevail. It is expected that dealers in these cities will be able to submit bids shortly after March 15 for the equipment of the new plant of the Gary Screw & Bolt Co., Gary, Ind. In most sections of the country, news of the freight rate decision has created little alarm.

Foundries

The Oliver Chilled Plow Works will soon ask for bids for the erection of a 576 x 135-foot malleable and gray iron foundry in Hamilton, Ont.

The addition to the Ross-Meehan Foundry Co., Chattanooga, Tenn., which will replace a structure destroyed by fire, is being rapidly completed at a cost of $22,000. Some new equipment for it may be purchased.

The Stoever Foundry & Mfg. Co., Myerstown, Pa., manufacturer of pipe-threading and cutting-off machines and shaking and dumping grates, has decided to erect a new plant at Easton, Pa. The Easton plant is to be new throughout and will be equipped with new and modern tools. The new plant is to be ready for operation before the end of the year.

Machine Tools

The Siler-Pettit Co., Fort Wayne, Ind., expects to erect a new plant for the manufacture of pumps in Chicago in the fall. The equipment in the new plant will consist principally of lathes, drill presses, milling machines, and a few light wood-working machines for pattern making.

Orton & Steinbrenner Co., 1806 Borland building, Chicago, is building a new plant for the manufacture of locomotive cranes and grab buckets, at Huntington, Ind. The building is nearly completed and some of the machinery has been purchased. The transmission machinery and small tool equipment for the structural shop, machine shop and forge shops has not yet been bought and prices are now being obtained on these items.

The M. H. Treadwell Co., 140 Cedar street, New York, which recently distributed a list calling for a large number of used machine tools, to be used in its new plant at Easton, Pa., finally decided to buy new tools instead and the list was awarded under the changed specifications last week. It was distributed between Manning, Maxwell & Moore, the Niles-Bement-Pond Co., and a Philadelphia machinery house. It is understood that the Treadwell company will soon issue specifications for additional machinery.

Iron and Steel Works

The Page Hersey Iron, Tube & Lead Co., Ltd, Toronto, Can., manufacturer of black and galvanized wrought merchant pipe, is considering the addition of a butt weld and galvanizing department. The details have not yet been decided on.

The Colonial Iron Co., 149 Broadway, New York, is placing contracts for the equipment for a new blast furnace, which it is about to erect at Riddlesburg, Pa. The company is now in the market for a blowing engine to serve as the main blowing unit.

At a special meeting to be held in Pittsburg, April 18, directors of the Union Steel Casting Co. will take action on the proposed increase in the capital stock of the company from $1,500,000 to $2,500,000. This company recently purchased additional land adjoining its present plant and announced plans for doubling the capacity of its works.

A large amount of machinery will be required by the newly organized Pittsburg Crucible Steel Co. in the development of the recently purchased coking coal property in Green county, Pa., and in the building of new works at Midland, Pa. In addition to the new electric furnace, open-hearth steel furnaces and other improvements outlined recently, plans being prepared by the company's engineers call for a modern mill for the manufacture of agricultural shapes. It is also stated that another blast furnace will be built at Midland.

Public Works

The citizens of Zearing, Ia., have voted to issue bonds for a new water works system.

Lancaster, Pa., will soon call for bids for the construction of an auxiliary pumping plant.

Sylvan Grove, Kas., will receive bids about June 1 for $35,000 worth of bonds for a water works system and electric light plant.

Walter E. Sexton, consulting engineer, Mineola, L. I., has prepared plans for the construction of a new $70,000 water works system at Westbury, L. I.

E. V. Patterson, borough clerk, Spring Lake, N. J., will receive bids until Mar. 10 for the mechanical equipment for an artesian water works plant.

Bids will be received until March 3 by the board of public works, Mt. Clemens, Mich., for a 3,000,000-gallon pumping engine for the city water works.

Jamestown, N. Y., has engaged experts to prepare plans and estimates for improving the local water plant so as to increase the pumping facilities and supply.

J. F. Norman and others are contemplating the establishment of a waterworks system at Lonsdale, Tenn., at a cost of $75,000. A franchise will

be created by the council of Lonsdale in the near future.

We are advised by F. H. Smith, city clerk, Emporia, Kan., that the proposed waterworks will cost $13,000, and the work will be done by the city. Mathew Brown, Emporia, is consulting engineer.

The borough council, Bristol, Pa., will receive bids until Mar. 20 for the construction of a water works system. Jay M. Whitham, 607 Bullitt building, Philadelphia, is engineer.

South America is presenting numerous opportunities for machinery purchases. Some large engineering projects are now under development there. Included in this work are the plans now being carried out for the installation of a new water system, a new sanitary system and other extensive improvements in the city of Guayaquil, Ecuador. The work represents a cost of about $8,000,000.

The Welland water commission, Welland, Ont., has secured from the Canadian minister of railways and canals water rights on the Welland canal. The commissioners are planning a new plant. The plans provide for a 30-foot intake and a capacity of 3,000,000 gallons a day and facilities for doubling this economically. There will be a power intake and waterworks intake. The powerhouse will have two water wheels, an electric apparatus, etc., while the pumping station will have a modern pumping equipment.

New Works

Bids are being received by the Sheet Metal Specialty Co., Follansbee, W. Va., for a two-story building to cost about $10,000.

The Ellwood City Iron & Wire Co., Ellwood City, Pa., has awarded a contract for the erection of a brick addition, 60 x 90 feet, to its plant.

Plans are being prepared by the Wheeling Can Co. for an extension to its present plant, which will more than double the capacity of the plant.

The International Steel & Iron Construction Co., Evansville, Ind., is planning to erect a new structural iron and steel plant. Construction work will commence towards the latter part of the coming summer.

Lawrence Brothers, manufacturers of hardware specialties, Sterling, Ill., have had plans prepared for a new plant by Raeder & Wood, Chicago. They expect to commence work on the new plant about April 1.

The Queen Bee Stove Co., Tulsa, Okla., manufacturer of gas ranges and heaters, is erecting a new plant. The first building, a two-story, 112 x 48-foot structure, is nearing completion and will be in operation by April 1.

The contracts on the proposed plant of the Crouse-Hinds Co., manufacturer of electrical apparatus, Syracuse, N. Y., have been let. The main building will be 246 x 283 feet and three stories high. The cost is estimated at $150,000.

Plans are being completed for the equipment of the plant of the National Adding Machine Co., Nashville, Tenn., which was incorporated with a capital stock of $15,000. A building has been secured. Newton H. White is president of the company.

Reports from Youngstown, O., state that the Youngstown Carriage Co., Youngstown, successor to the Youngstown Carriage & Wagon Co., that city, is preparing plans for a new plant. The newly organized company has a capital stock of $100,000.

Articles of incorporation have been filed at Chattanooga, Tenn., by the Sybilla Elevator & Mfg. Co., which has $50,000 capital stock. Frank Sybilla is the principal stockholder. The company will manufacture freight and passenger elevators and will establish a plant at once.

The Welsh Machinery Mfg. Co., and James Rowe, 444 South Jefferson street, Chicago, is contemplating the erection of a machine shop near Van Buren and Aberdeen streets, Chicago. The plant will require shafting, belting, pulleys, shaft hangers, electric motors, lathes, drill presses and other machine tool equipment.

The Severence Mfg. Co. has been incorporated at Nashville, Tenn., with $100,000 capital stock. It will manufacture gas machines, carburetors, lamps and other devices consuming gasoline. V. C. Severence, J. I. D. Hinds and others are the incorporators. A plant will be erected and equipped, it is announced.

Bids will be invited about Mar. 15 for the necessary machinery and equipment for the new plant to be built at Gary, Ind., by the Gary Screw & Bolt Co., plans for which were announced recently. The new plant will be equipped with motor-driven machinery. Samuel E. Duff, Empire building, Pittsburg, is consulting engineer.

The American Can Co. has acquired the foundry and machine shops of the defunct Neafie & Levy Ship & Engine Building Co., Kensington, Philadelphia, and is inviting estimates for the demolition of the old buildings upon the site, preparatory to the erection of a plant. A group of five-story buildings, at an estimated cost of about $200,000, will be erected. The property has a frontage of 114 feet on Palmer street, 350 feet on Beech street, and 250 feet on Allen street.

Contracts have been awarded by the Pittsburg Machine Tool Co. for its new works at Braddock, Pa., which include a one-story brick structure, 216 x 100 feet, with a power house annex, 30 x 40 feet. The powerhouse will be equipped with an 80-horsepower gas engine and a 100-horsepower steam engine. A crane runway with a 30-foot span and 250 feet in length will be erected to extend over a railway siding and a 10-ton electric traveling crane will be installed.

Power Plant Equipment

Jaffrey, N. H., will probably erect an electric light and power plant in the near future.

Cynthiana, Ind., will soon ask for bids for the construction of a new electric light plant.

The towns of Afton and Grand River, Ia., are considering the erection of electric lighting plants.

Olean, N. Y., John Gaynor, city engineer, is planning the erection of a municipal electric light plant.

The Westport Water Co., Westport, Ct., is planning to make expensive improvements to its electrical equipment.

The director of public service, Sandusky, O., is securing plans and estimates for a municipal electric light plant.

The municipal electric light plant of Dothan, Ala., will be considerably improved. B. R. Pilcher is manager of the plant.

The Nashville Electric Light Co., Nashville, Tenn., is planning to install a steam turbine besides making other improvements.

The American Metallic Packing Co., Lexington, Ky., is asking for prices on engines and boilers to furnish power for a sawmill.

The Glendale, Ky., Lumber Co. is in the market for a 15-horsepower gasoline engine. It is establishing a planing mill.

Luray, Kas., and Sylvan Grove, Kas., are both considering the construction of water works and electric lighting systems.

The city authorities of Olean, N. Y., are considering plans for establishing a municipal lighting plant. John Gaynor is city engineer.

The Indiana legislature has appropriated $10,800 for an electric light plant to be erected for the University of Indiana, Bloomington, Ind.

The city council, Binghamton, N. Y., is considering a $160,000 bond issue

for the purpose of raising funds for a municipal electric light plant.

Ashdown, Ark., is considering tne erection of a municipal lighting plant.

The city council of Boynton, Okla., is considering the installation of a municipal lighting and water works system.

Engineers Sarvent & Lundy, of Chicago, have completed plans for a new pumping station to be built at Wheeling, W. Va., for the Wheeling Electric Co.

The health and hospital committee of the city council, Minneapolis, Minn., has voted to expend $3,000 for a new generator for Hopewell hospital.

The Lockport Light, Heat & Power Co. has decided to issue $70,000 in bonds to provide capital for improvements and an extension to its present plant.

Contracts for a hydro-electric plant of 1,000 horsepower will be let about May 1 at Glen, Tex. Woodford M. Davis, fiscal agent, Dallas, Tex., can furnish information.

The city of Coldwater, Kan., expects to construct an electric light plant to cost $29,000. Plans have been prepared by J. S. Worley & Co., consulting engineers, Kansas City.

Jackson, Tenn., will issue $20,000 for the purpose of improving the municipal light plant. The city has refused to contract for light service with the Jackson Railway & Light Co.

The Nortonville Coal & Coke Co., Nortonville, Ky., has announced plans for a power plant. Besides increasing the capacity of its mines, it will furnish electric lights for Nortonville.

The Sillcocks-Miller Co., South Orange, N. J., has under construction a factory, 50 x 100 feet, and a power house. A separate power plant will be installed to operate a ventilating system.

Bids will be received until Mar. 13 by J. C. Armstrong, borough clerk, Etna, Pa., for construction, delivery and erection of machinery, boilers, lamps and buildings for the new borough light plant.

Bids will be received until Mar. 14 by the Salt River Valley Water Users' Association, Phoenix, Ariz., for electric apparatus and two hydraulic turbines to be installed in a new plant for irrigation purposes.

The Wheeling Traction Co., Wheeling, W. Va., is preparing plans for extensions to its present power plant. G. O. Nagle, general manager, announces that a low pressure steam turbine engine will be installed.

The National Spring Bed Co., New Britain, Conn., is planning the erection of a large new plant on Lake street, that city. A 30 x 40-foot boiler house is to be included. Unkelbach & Perry, New Britain, are the architects.

The Joplin & Pittsburg Railway Co., Pittsburg, Pa., is considering plans for the construction of a power house. A 400-kilowatt generator, a 600-horsepower engine and a 150-horsepower boiler will probably be purchased.

The Lehigh Coal & Navigation Co. is planning the establishment of an electric power and light plant at Nesquehoning, Pa. It is planned to utilize the waste coal washed away from the breakers for the generation of power.

The People's Gas, Light & Coke Co., Chicago, is taking bids on a building for a new pumping station and boiler house, 84 x 113 feet, to be erected in Chicago. The new plant will require four pumps, three engines and three exhausters.

Miscellaneous

We are advised by the Federal Motor Truck Co., Detroit, Mich., that it is in the market for an air compressor and is now getting prices.

A contract has been awarded to the Erie City Iron Works, Erie, Pa., for two 150-horsepower return tubular boilers to be installed at the Pittsburg plant of the Entress Bros. Co., manufacturer of brick.

An order has been placed with the Westinghouse Electric & Mfg. Co. by the Pemberton Coal & Coke Co. for a 150-kilowatt 250-volt, 200 revolutions per minute direct-current engine type generator, a main station switchboard and a 150-kilowatt sub-station motor generator set.

The Lewis Electric Welding & Mfg. Co., 234 Cherry street, Toledo, O., reports that on account of its steadily increasing business it is constantly adding new machinery to its equipment. This concern makes automobile valves, stationary and marine motors and motor parts.

The Mesta Machine Co., Pittsburg, at its West Homestead, Pa., works, is building a vertical blowing engine 46 x 84 x 60 inches, for the Algoma Steel Co. and has received a contract from the Sharon Steel Hoop Co., Sharon, Pa., for a 57-inch, Helander, barometric condenser, together with a 12 x 20 x 16-inch dry air pump.

The Westinghouse Electric & Mfg. Co., Pittsburg, has received an order from Chalchuapa, Salvador, Central America, for the following equipment to be installed in a new light plant: One 100 kilo-volt-ampere, three-phase, 60-cycle, 2,200-volt, 600 revolutions per minute, waterwheel generator with exciter and switchboard; 18 1½-kilo-volt-ampere transformers, six 6.6 ampere alternating current multiple enclosed arc lamps.

The Bruce, Macbeth Engine Co., Cleveland, has booked the following orders recently: Two 75-horsepower, four-cylinder, producer gas engines, to the Acme Garage, New York City; one 75-horsepower, four-cylinder, natural gas engine, to the Olympic Theater, Pittsburg; one 65-horsepower, artificial gas engine, to the National Magazine, Boston; two 135-horsepower, four-cylinder, natural gas engines, each direct-connected to 85-kilowatt generators, to the Cameraphone building, Pittsburg; one 35-horsepower, two-cylinder, gasoline engine, to the Apollo Water Works, Apollo, Pa.

Government News

There was an unusually important opening of bids at Washington, Feb. 25, by the Isthmian Canal Commission. The bids were as follows:

Class 1. Gate-Valve Machines.

Item 1.—Two Stoney gate-valve machines, complete except motor and limit switch, but including for each machine one set wrenches and wrench-board: Camden Iron Works, Camden, N. J., $44,800; Exeter Machine Works, Pittston, Pa., $14,856.62, delivery to commence in 60 days and be completed in 120 days from date of receipt of award; Fawcus Machinery Co., Pittsburg, $21,600, delivery in 110 days; Minneapolis Steel & Machinery Co., Minneapolis, $18,316, from 180 to 210 days; Moran Steel Co., Seattle, $24,000, 126 days; Otis Elevator Co., New York, $19,750, 120 to 150 days; Pittsburg Valve, Foundry & Construction Co., Pittsburg, $20,270, 125 to 135 days; United Engineering & Foundry Co., Pittsburg, $21,210, 120 days; Allis-Chalmers Co., Milwaukee, $19,180, 170 days; Westinghouse Machinery Co., East Pittsburg, $22,950, 145 to 152 days; Wheeling Mold & Foundry Co., Wheeling, W. Va., $15,800, 120 days.

Item 2.—114 Stoney gate-valve machines as above, except that wrenches and wrench-board are not included: Camden Iron Works, $1,732,800; Exeter Machine Works, $763,800, delivery in from 60 to 550 days; Fawcus Machine Co., $667,000, 90 to 775 days; Minneapolis Steel & Machinery Co., $831,402, 180 to 1,100 days; Moran Steel Co., $1,140,000, 1,092 days; Otis Elevator Co., $910,290, 90 to 120 days; Pittsburg Valve, Foundry & Construction Co., $787,284, 105 to 503 days; United Engineering & Foundry Co., $805,000, 120 days; Allis-Chalmers Co., $812,250, 80 to 460 days; Westinghouse Machine Co., $895,812, 135 to 142 days; Wheeling Mold & Foundry Co., $689,700, 42 to 630 days.

Item 3.—Spare parts for above machinery, as per specifications: Camden Iron Works, $43,600; Exeter Machine Works, $14,817.70; Fawcus Machinery Co., $15,968.07; Minneapolis Steel & Machinery Co., $20,538.68; Moran Steel Co., $18,108.16, 1,062 days; Otis Elevator Co., $27,245.27; Pittsburg Valve, Foundry & Construction Co., $17,548.20; United Engineering & Foundry Co., $19,178; Allis-Chalmers Co., $16,684.52, 120 days; Westinghouse Machine Co., $18,747.19; Wheeling Mold & Foundry Co., $13,879.

Class 2. Valve Machines.

Item 1.—Two cylindrical valve machines, complete except motor and limit switch: Camden Iron Works, $6,000; d'Olier Engineering Works, $5,600; Minneapolis Steel & Machinery Co., $3,082; Fawcus Machine Co., $3,400, 110 days; Otis Elevator Co., $2,350; Pittsburg Valve, Foundry & Construction Co., $4,536, 105 to 115 days; Richard Mfg. Co., Bloomsburg, Pa., $2.188, 90 to 110 days; Rosedale Foundry & Machine Co., Pittsburg, $3,300, 90 to 110 days; Union Machine Co., San Francisco (Ancon delivery), $3,301, 120 days; United Engineering & Foundry Co., Pittsburg,

$3,600, 150 days; Williamson Bros. & Co., Philadelphia, $3,400, 100 days; Glenfield & Kennedy, Ltd., Kilmarnock, Scotland, $3,650, 150 days; Allis-Chalmers Co., $4,618, 170 days; Westinghouse Machine Co., $3,240, 90 to 507 days; Wheeling Mold & Foundry Co., $2,270, 120 days.

Item 2.—118 cylindrical valve machines, complete except motor and limit switch: Camden Iron Works, $259,600; d'Olier Engineering Co., $122,130, 70 to 510 days; Fawcus Machine Co., $115,000, 90 to 755 days; Minneapolis Steel & Machinery Co., $108,147, 152 to 1,030 days; Otis Elevator Co., $117,410, 120 to 510 days; Pittsburg Valve, Foundry & Construction Co., $116,407, 75 to 488 days; Richard Mfg. Co., $105,964, 60 to 610 days; Rosedale Foundry & Machinery Co., $127,440, 100 to 475 days; Union Machine Co., $103,486, 60 to 500 days; United Engineering & Foundry Co., $132,868, 120 to 300 days; Williamson Bros. & Co., $156,350, 50 to 935 days; Glenfield & Kennedy, Ltd., $97,350, 90 to 300 days; Allis-Chalmers Co., $156,822, 80 to 460 days; Westinghouse Machine Co., $126,378; Wheeling Mold & Foundry Co., $102,660, 42 to 375 days.

Item 3.—Spare parts for above machinery: Camden Iron Works, $3,587.40; d'Olier Engineering Co., $2,010.48, 180 days; Fawcus Machinery Co., $1,768.35, 110 days; Minneapolis Steel & Machinery Co., $1,857.86; Otis Elevator Co., $2,215.71; Pittsburg Valve, Foundry & Construction Co., $1,845.70; Richard Mfg. Co., $1,441.80; Rosedale Foundry & Machine Co., $2,643.09; Union Machine Co., $1,456.23; United Engineering & Foundry Co., $2,128; Williamson Bros. & Co., $2,929.32; Glenfield & Kennedy, Ltd., $1,536.90; Allis-Chalmers Co., $1,966.54; Westinghouse Machine Co., $2,192.61; Wheeling Mold & Foundry Co., $2,068.

Class 3. Motors.

Item 1.—Two motors for Stoney gate-valve machines: Allis-Chalmers Co., $3,200; Westinghouse Electric & Mfg. Co., Pittsburg, $4,454; General Electric Co., Schenectady, N. Y., $2,632.

Item 2.—114 motors, as above: Allis-Chalmers Co., $78,318; Westinghouse Electric & Mfg. Co., $64,954; General Electric Co., $70,338.

Class 4. Motors.

Item 1.—Two motors for cylindrical valve machines: Allis-Chalmers Co., $2,601, 170 days; Westinghouse Electric & Mfg. Co., $3,822, 112 days; General Electric Co., $1,280.

Item 2.—Allis-Chalmers Co., $41,300, 80 to 460 days; Westinghouse Electric & Mfg. Co., $32,652, 80 to 420 days; General Electric Co., $36,580.

Class 5. Switches.

Item 1.—Two limit switches for Stoney gate-valve machines: A. & J. M. Anderson Mfg. Co., Boston, $250; Cutler-Hammer Mfg. Co., Milwaukee, $196; Otis Elevator Co., $314, delivery in 20 days; Allis-Chalmers Co., $392, 170 days; Westinghouse Electric & Mfg. Co., $225, 112 days; General Electric Co., $196.

Item 2.—114 limit switches as above: A. & J. M. Anderson Mfg. Co., $8,436; Cutler-Hammer Mfg. Co., $5,586; Otis Elevator Co., $6,840, 120 to 510 days; Allis-Chalmers Co., $9,234, 80 to 460 days; Westinghouse Electric & Mfg. Co., $6,637; General Electric Co., $6,612.

Item 3.—Two limit switches for cylindrical valve machines: A. & J. M. Anderson Mfg. Co., $250; Cutler-Hammer Mfg. Co., $196; Otis Elevator Co., $314, delivery in 120 days; Allis-Chalmers Co., $392, 170 days; Westinghouse Electric & Mfg. Co., $225, 112 days; General Electric Co., $196.

Item 4.—118 limit switches as above: A. & J. M. Anderson Mfg. Co., $8,932; Cutler-Hammer Mfg. Co., $5,782; Otis Elevator Co., $7,080, 90 to 400 days; Allis-Chalmers Co., $9,558, 80 to 460 days; Westinghouse Electric & Mfg. Co., $6,873; General Electric Co., $6,844.

Items calling for two pieces of machinery are for trial purposes. Should these machines fail, specifications for the remainder will be altered.

Time of delivery—an important item—is given where bidder stated it. In all cases where time was stated, it means commencement and end of delivery. Delivery at Colon, except where Ancon is specified.

Navy Supplies.

Bids are invited by the bureau of supplies and accounts, navy department, Washington, as follows:

Until March 14: Baskets and spindle for motor-driven centrifugal, delivery at Washington, schedule 3371; miscellaneous blowers, Portsmouth, N. H., schedule 3375; 1,500 galvanized iron or steel buckets, Brooklyn, schedule 3377; 75 grapnels, Norfolk, schedule 3373; 154 feet 1½-inch suction hose, Norfolk, schedule 3377; 500 pounds brass nuts, Brooklyn, schedule 3377; 3,000 pounds brass condenser tubing, Boston, schedule 3377; 24 2½-inch brass globe valves, Brooklyn, schedule 3377; 5,000 pounds round brass, Washington, schedule 3371; 1,500 pounds sheet brass, Brooklyn, schedule 3375; 175,000 pounds manganese bronze ingots, Washington, 3371; 14,500 pounds naval bronze, Washington, schedule 3371; 308,480 pounds steel castings, Washington, schedule 3371; 18,000 pounds wrought iron bars, Brooklyn, schedule 3374; 3,500 pounds half-and-half solder, Brooklyn, schedule 3374; 72,500 pounds steel angles, Boston, schedule 3375; 47,000 pounds steel billets, class A, Brooklyn, schedule 3375; 2,100 pounds, cold-rolled machinery steel, Brooklyn, schedule 3374; 63,600 pounds medium bar steel, Brooklyn, schedule 3374; 69,500 pounds steel plates and shapes, Boston, schedule 3374; 40,000 pounds medium steel plates, Charleston, S. C., schedule 3374; 3,500 pounds sheet range steel, Brooklyn, 3374; 44,800 pounds ingot tin, Brooklyn, schedule 3375; 8,000 pounds sheet zinc, Brooklyn, 3374.

Until March 21: Two motor-driven lathes, Norfolk, schedule 3367; one mortising machine, Charleston, S. C., schedule 3366.

Until April 4: One electric crane, Mare Island, Cal., schedule 3368.

Bids Opened.

Bids opened at the bureau of supplies and accounts, navy department, Washington, Feb. 21, were as follows:

GRINDER.—One self-contained, motor-driven, plain gap grinder for grinding piston rods with heads on, to swing 20 inches diameter, diameter through gap 36 inches, and 144 inches between centers; gap to be 18 inches wide: Halliday Machinery Co., Seattle, $4,580; Manning, Maxwell & Moore, New York, $5,390.

TURNING GEAR.—Hydraulic turning gear for 13-inch superimposed turret, including motors, mechanical control gear in triplicate and electrical turning gear: Cutler-Hammer Mfg. Co., Milwaukee, $10,990; Diehl Mfg. Co., Elizabethport, N. J., $3,575 and $3,425, part bids; General Electric Co., Schenectady, N. Y., $3,360, part bid; Waterbury Tool Co., New Britain, Conn., part bid, $3,400.

TURNING GEAR.—Turning gear for 12-inch and 8-inch superimposed turrets, and controlling mechanism: Cutler-Hammer Mfg. Co., Milwaukee, $27,150; Diehl Mfg. Co., Elizabethport, N. J., $3,309, part bid; Waterbury Tool Co., New Britain, Conn., $25,800.

TURNING GEAR.—Turning gear for two 13-inch turrets: Cutler-Hammer Mfg. Co., Milwaukee, $3,408.80, part bid; Diehl Mfg. Co., Elizabethport, N. J., $996, part bid; Waterbury Tool Co., New Britain, Conn., $8,500.

GAS ENGINES.—Four 20-horsepower two-cycle gas engines, marine type: Automatic Machine Co., Bridgeport, $3,900; Bevier Gas Engine Co., Kalamazoo, $4,100; Bruns-Kimbal Co., New York, $2,442; Camden Machine Co., Camden, Me., $3,400; Clifton Motor Wks., Cincinnati, $3,100; Arthur P. Homer, Boston, $4,200; Chas. J. Yager Co., Boston, $3,100; Lamb Engine Co., New York, $2,796; Murray & Tregurtha Co., Boston, $3,616; New York Launch & Engine Co., New York, $4,200; Standard Motor Construction Co., Jersey City, $4,842; Sterling Engine Co., Buffalo, $3,044.

JACKS.—Hydraulic jacks, 18-inch rise, two 20-ton and one 30-ton: Geo. S. Fowler, Washington, $260; Joyce Cridland Co., Dayton, O., $215.60; J. B. Kendall Co., Washington, $273; Vermilvi & Power, New York, $276.50; Watson-Stillman Co., New York, $297.50.

BRONZE ROD.—Naval bronze rod as follows: Round, 2,000 pounds ⅞ inch, and 2,000 pounds 2½ inches diameter; hexagon, 400 pounds 4 inches diameter and 500 pounds 3 inches diameter: National Brass & Copper Tube Co., New York, $928.50; Taunton-New Bedford Copper Co., New Bedford, Mass., $788.50; Ansonia Brass & Copper Co., New York, $790.55.

BAR STEEL.—6,650 pounds cold-rolled bar machinery steel, assorted diameters in 20-foot lengths: Bethlehem Steel Co., South Bethlehem, $389.28; Baker & Hamilton, San Francisco, $291.90; Crucible Steel Co., Pittsburg, $485.80; Foukar, Ray & Simon, San Francisco, $225.87; Philadelphia Steel & Forge Co., Philadelphia, $480.

BAR STEEL.—97,500 pounds medium bar steel, flat, round and square, as specified in commercial lengths: Bethlehem Steel Co., So. Bethlehem, $3,560.91; Baker & Hamilton, San Francisco, $2,195.25; Crucible Steel Co., Pittsburg, $2,270.35; Dunham, Carrington & Hayden, San Francisco, $2,122.75; J. B. Kendall Co., Washington, $2,156.25; Midvale Steel Co., Philadelphia, $3,116.25.

INGOT TIN.—800 pounds phosphor ingot tin: Berry & Aiken, Philadelphia, $0.59; Jas. Clendennin, Baltimore, $0.57; Great Western Smelting & Refining Co., San Francisco, $0.53⅜; Nassau Smelting & Refining Works, New York, $0.509; W. T. Hungerford Brass & Copper Co., New York, $0.485.

BOLTS AND NUTS.—11,700 pounds semi-finished steel bolts and nuts: Baker & Hamilton, San Francisco, $1,210; Perrin Machinery Co., Seattle, $885.75; R. B. Sherman Co., New York, $898.25.

BORING BARS.—Two boring bars for Nos. 4 and 5 lathes: Bethlehem Steel Co., South Bethlehem, $5,126.25; Midvale Steel Co., Philadelphia, $4,716.15.

STEEL.—113,500 pounds hot-rolled or forged steel, round or square, as specified: Bethlehem Steel Co., South Bethlehem, $3,449.94; Colonial Steel Co., Pittsburg, $4,302; Crucible Steel Co., Pittsburg, $2,971.20; R. C. Hoffman Co., Baltimore, $2,505.60; Philadelphia Steel & Forge Co., New York, $3,057.75; Pittsburg Forge & Iron Co., Pittsburg, $3,340; Pennsylvania Forge Co., Philadelphia, part bid, $152.40; James W. Siderquist, Boston, $2,796.30; Midvale Steel Co., Philadelphia, $4,122.75.

STEEL.—9,650 pounds hot-rolled machine steel, round or flat, as specified: Bethlehem Steel Co., South Bethlehem, $0.02566 per pound; Crucible Steel Co., Pittsburg, $177.89; Carnegie Steel Co., Philadelphia, $0.0184 per pound.

STEEL.—9,500 pounds forging steel, 15 to 20 point carbon, round and flat, as specified: Same bidders, respectively, $0.0267, $203.31 and $0.019.

STEEL.—6,100 pounds cold-rolled machine steel, round, hexagon, square and flat, as specified: Bethlehem Steel Co., $0.085.

STEEL ROD.—500 pounds nickel steel rod, ¾ inch and 1¼ inches, as specified: Bethlehem Steel Co., $0.35; Crucible Steel Co., $0.50; Midvale Steel Co., $0.3525.

DRILL ROD.—340 pounds tool steel drill rod: Crucible Steel Co., $42.76; J. B. Kendall Co., Washington, $43.35; New Process Steel Co., Lancaster, Pa., $44.20; Philadelphia Steel & Forge Co., New York, $62.90; Pittsburg Tool Steel Wire Co., Monaca, Pa., $0.118.

CHAIN.—3,500 pounds short-link, black iron chain: Baker, Sigsbee & Co., New York, $0.06 and $0.05 per pound; Berry & Likens, Philadelphia, $0.074; Baker, Carver & Morell, New York, $0.058; The Graw, Limer & Co., New York, $0.0662; J. B. Kendall Co., Washington, $0.0515; Marine Mfg. & Supply Co., New York, $0.061; Manning, Maxwell & Moore, New York, $0.0574; Newhall Chain, Forge & Iron Co., New York, $0.0619; Richard & Gardner Co., New York, $0.0645; Standard Chain Co., Pittsburg, $0.054; Vermilyi & Power, New York, $0.0618; Manhattan Supply Co., New York, $0.0687

TUBING.—6,300 feet lap-welded steel tubing—Brooklyn Equipment Co., Brooklyn, $3,210; Chandler & Floyd, New York, $2,973.50; Cuyler & Moeller, Baltimore, $1,005; Philip S. Francis, Philadelphia, $2,970; Material Supply Co., Oradell, N. J., $2,925; Rockwell Furnace Co., New York, $3,502.

STEEL PLATES.—36,650 pounds medium steel plates: Berry & Aikens, Philadelphia, $0.0203; Carnegie Steel Co., Philadelphia, $0.0186; R. C. Hoffman, Baltimore, $0.0186; J. B. Kendall Co., Washington, $0.01849; Worth Bros., Washington, $0.0184.

STEEL PLATES.—35,500 pounds medium steel plates: Carnegie Steel Co., Philadelphia, $0.019; R. C. Hoffman, Baltimore, $0.0185; J. B. Kendall Co., Washington, $0.01849; Worth Bros., New York, $0.01845.

STEEL ANGLES.—21,700 pounds medium steel angles: Carnegie Steel Co., Philadelphia, $0.018; R. C. Hoffman, Baltimore, $0.0176; J. B. Kendall Co., Washington, $0.01791.

CHANNELS.—22,500 pounds medium steel shipbuilding channels: Carnegie Steel Co., Philadelphia, $0.0174; R. C. Hoffman, Baltimore, $0.0174; J. B. Kendall, Washington, $0.0178.

SHEET STEEL.—77,000 pounds galvanized sheet steel: R. S. Bishop, Washington, $1.643.74; R. C. Hoffman, Baltimore, $2,078.01; J. B. Kendall, Washington, $2,084.45; Meurer Bros., Brooklyn, $2,101.32; Merchant & Evans, Philadelphia, $2,107.89; Vermilyi & Power, New York, $2,132.22; Manhattan Supply Co., New York, $2,119.32.

Wire Cloth.

Circular No. 622-B, about to be issued by the Isthmian Canal Commission, Washington, will invite bids on 41,220 feet welded steel wire cloth.

Turbine-Driven Compressor for Blast Furnaces

This Blowing Unit Increases the Melt, Improves the Quality of the Iron and Effects Other Economies in Blast Furnace Operation

By Richard H. Rice

The General Electric Co., Schenectady, N. Y., recently placed in operation at the Oxford furnace plant of the Empire Iron & Steel Co., Oxford, N. J., a turbine-driven air compressor for blowing a blast furnace, which is the first installation of this type of apparatus to be made in this country.

The unit consists of a six stage compressor operating at a normal speed of 1,650 revolutions per minute, and driven by a direct-connected, four-stage Curtis steam turbine. The design is such that this normal speed produces a blast pressure of 15 pounds per square inch. The unit is, however, designed to regulate the volume of air delivered per minute so as to keep the rate of discharge constant at any value determined by the furnace superintendent, within its capacity. This regulation is accomplished by means of speed variations, so that the machine is a constant volume, variable speed apparatus, and not constant speed as in other classes of blowing units.

The six stages of which the compressor is composed are arranged in series, so that the air enters at the end of the compressor nearest the steam turbine driver, and passes successively from stage to stage until it reaches the other end of the compressor casing, where it enters the discharge pipe. The impeller wheels are so designed that there is no unbalanced end thrust, and the ordinary means used in the Curtis turbine for locating the rotating elements and preserving proper clearances are sufficient for the entire apparatus.

The air is cooled during compression in each stage, and also in passing between stages by suitable water chambers in the diaphragms, and this cooling is sufficient to maintain the compression approximately along the adiabatic line. No valves or rubbing surfaces are used in the compressor construction, and, as in the turbine, the rotating elements revolve freely with ample clearance so that no wear or deterioration can take place; therefore, the efficiency of compression must remain constant.

Both turbine and compressor fortunately attain their best efficiency under similar conditions as regards rotating speed. Therefore, the combination is a logical and efficient one. Furthermore, under conditions usually met with in blast furnace operation involving pressures of blast of 10 to 20 pounds per square inch, the efficiency remains sensibly the same. A curve of efficiency at varying volumes is shown in Fig. 4 and above this has been drawn a curve of speeds and pressures which, taken in connection with the efficiency curve, shows the variations of efficiency with pressure at rated volume.

This curve of speeds and pressures shows graphically the variation of pressure with change of speed which follows the law of squares; that is, double speed gives four times pressure, etc. From this it will be seen that only moderate changes in speed are necessary to give wide changes in pressure. It is these changes in speed, increasing or decreasing the blast pressure, which are utilized to maintain a constant rate of flow of air into the furnace against the varying resistances set up in the tuyeres and furnace by varying furnace conditions, as, for instance, clogging of

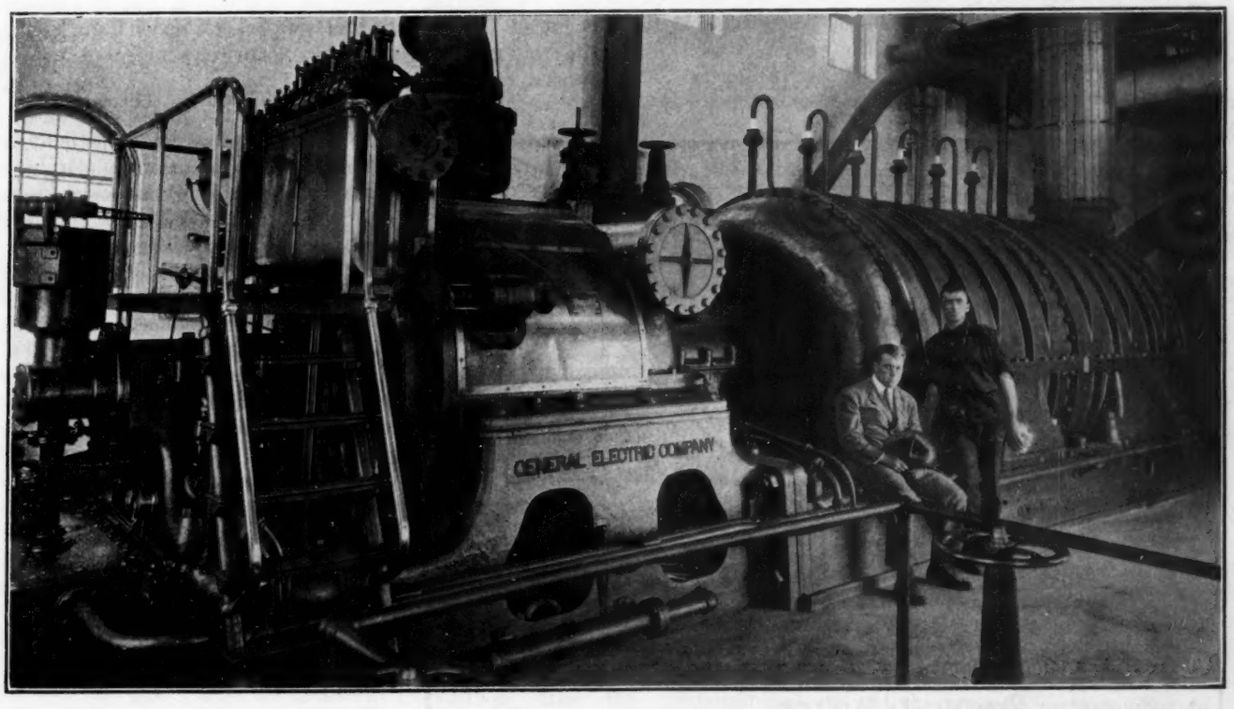


FIG. 1—CURTIS STEAM TURBINE, 1,740-HORSEPOWER CAPACITY, DIRECT-CONNECTED TO AN AIR COMPRESSOR WHICH FURNISHES THE BLAST FOR THE OXFORD FURNACE OF THE EMPIRE IRON & STEEL CO., OXFORD, N. J.

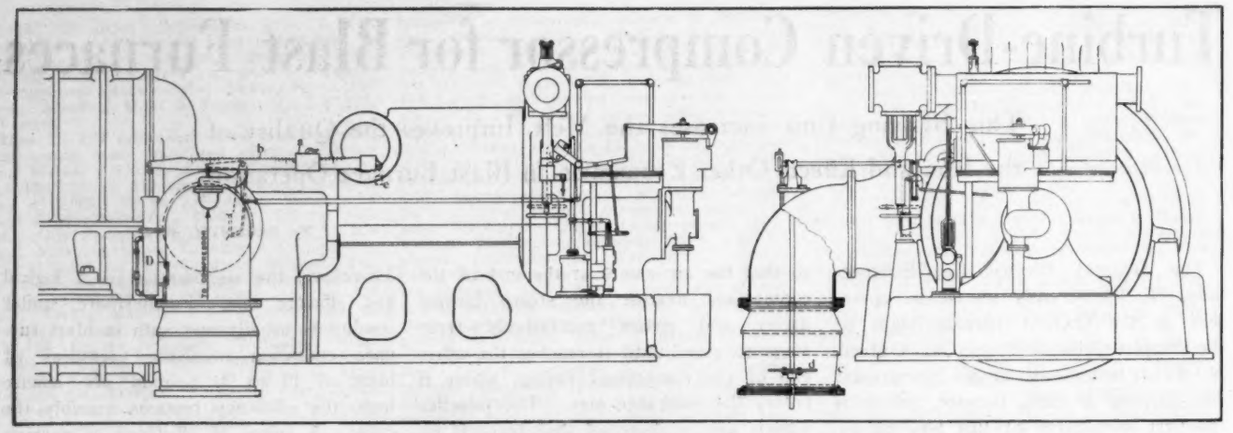


FIG. 2—THE AIR COMPRESSOR, SHOWING THE CONSTANT VOLUME GOVERNOR

tuyeres and changes in the size and composition of the charge, temperatures, etc.

The means by which these changes of speed are produced in the manner necessary to keep up a constant rate of influx of air per minute is shown in Fig. 2. This shows a steel disc sustained on the inflowing air current within a conical enlargement of the inlet pipe. By means of the sliding weight, *a*, the resistance of this float and displacement by the air current is adjusted in accordance with a scale in the scale beam, *b*, which is graduated accurately to read, in cubic feet per minute, volumes of free or atmospheric air. By setting this weight at the graduation corresponding to the rate of discharge of air desired, the disc is caused to assume a position in the conical enlargement, *c*, which results in supplying steam to the turbine in quantity sufficient to establish the proper speed of the compressor and pressure of blast to cause the required flow of air through the furnace. In case the rate of air flow tends to decrease, the disc, *d*, sinks to a lower point in the enlargement, *c*, since the supporting air current decreases its sustaining power; by this more steam is admitted to the turbine and the speed is increased, resulting in an increase of pressure, and this increased pressure re-establishes the desired flow of air. In case too much air tends to flow into the furnace, the reverse of these effects takes place.

This method of governing by the indications of a properly calibrated scale beam gives an entirely new instrument, which, in the hands of a skilled furnace manager, will undoubtedly enable improved results in furnace operation to be obtained, since an accurate knowledge of the amount of air supply is always at hand by this means.

In normal blast furnace operation, pressures may vary from 10 to 20 pounds per square inch. These pressures require speeds, in this apparatus, of about 1,500 for 10 pounds pressure to 1,800 for 20 pounds, as appears on the curve, Fig. 4. The blast furnace operator, therefore, instructs the engineer operating the compressor not to maintain a certain number of revolutions, as is customary with reciprocating engines, but to set the scale beam weight for the required volume in cubic feet per minute.

The graduation and calibration of the scale beam in cubic feet per minute is determined during the shop test of the apparatus before shipment by accurate tests with standard orifices and pitot tubes and these graduations are accurate within about 2 per cent. A simple oil dashpot, *D*, Fig. 2, attached to the scale beam, prevents any racing or undue fluctuations of speed.

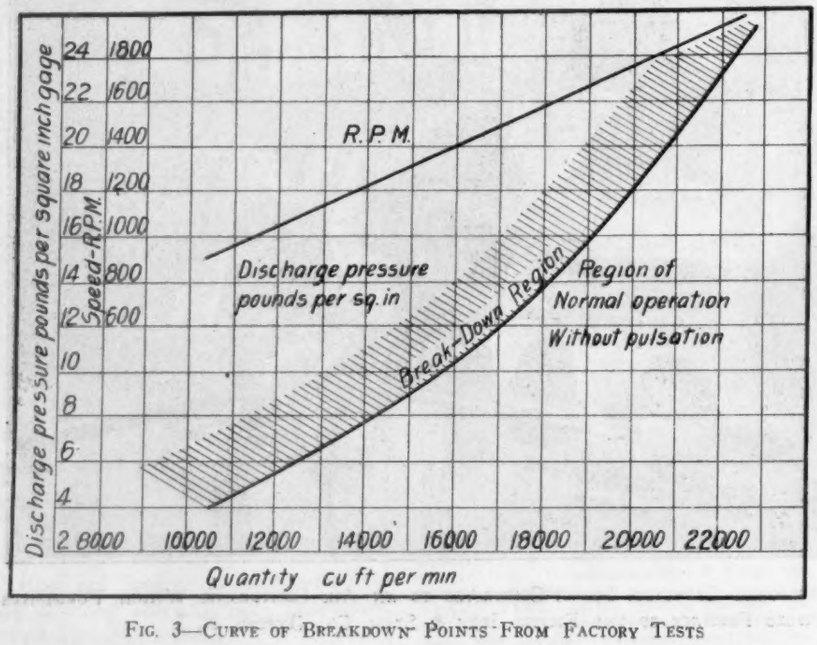


FIG. 3—CURVE OF BREAKDOWN POINTS FROM FACTORY TESTS

Manipulated by Throttle.

In operating the blowing unit, it is only necessary to manipulate the hand throttle valve in the main steam pipe when it is desired to bring the compressor to rest. At all other times, control is effected through the scale beam, with wide open throttle. When checking the furnace or casting, the weight, *a*, Fig. 2, is moved to the extreme end of the scale beam at the position indicating the minimum volume for which the scale beam, *b*, is graduated, and a still further decrease of speed and pressure is produced by adding an auxiliary weight at this end of the beam or by depressing it by hand. On removal of the auxiliary weight and replacement of the sliding weight, *a*, at the running volume graduation, the compressor speeds up until the volume required is obtained.

The air governor acts upon the pilot valve of the hydraulic valve gear commonly used on the larger sizes of the

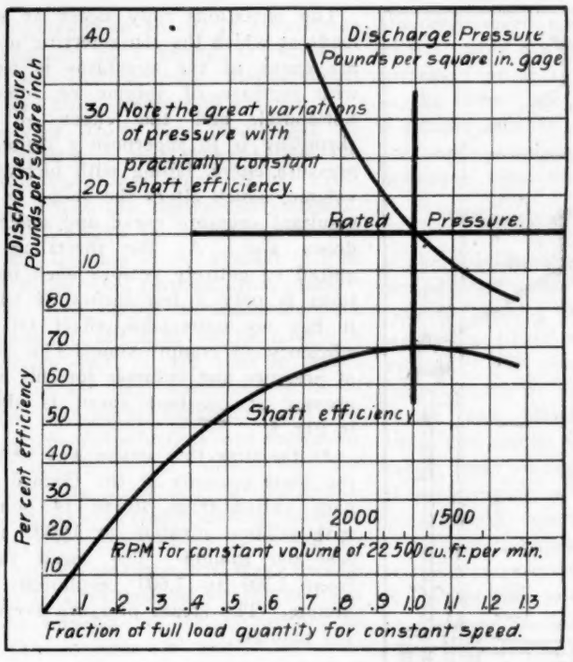

Discharge Pressure
Pounds per square in. gage
Note the great variations of pressure with practically constant shaft efficiency.
Rated Pressure.
Discharge pressure Pounds per square inch
Per cent efficiency
Shaft efficiency
2000
1500
R.P.M. for constant volume of 22,500 cu. ft. per min.
Fraction of full load quantity for constant speed.

FIG. 4—EFFICIENCY AND PRESSURE CURVE WITH CONSTANT VOLUME GOVERNOR

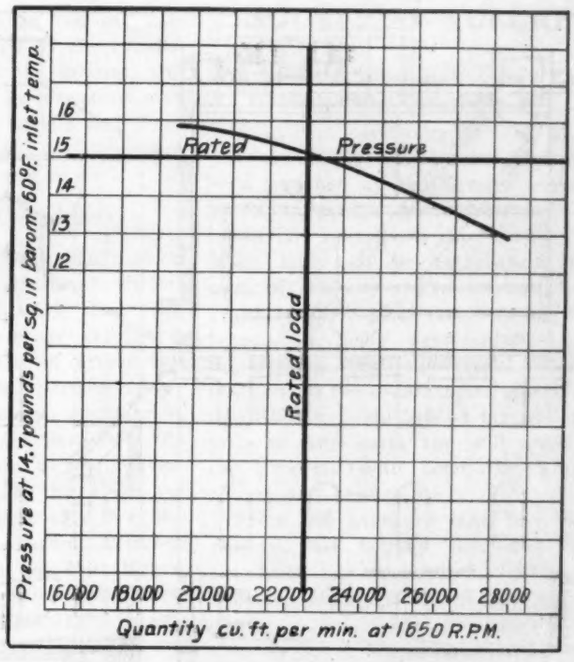


FIG. 5—CURVE OF PRESSURE AND VOLUME OF AIR COMPRESSOR AT CONSTANT SPEED

Curtis turbine, through a system of floating levers, in such a manner that when the turbo-compressor approaches the maximum speed for which it is designed, in this case 1,950 revolutions per minute, a centrifugal governor of the usual type comes into action and keeps the speed at this maximum so long as the resistance to air flow in the furnace or tuyeres remains so high that the volume of air, for which the air governor is set, cannot be forced through at the maximum pressure to which this speed corresponds—in this case, 25 pounds per square inch. During this period the air governor is out of control of speed, but it comes into action immediately when the furnace resistance decreases.

In case of breakage or sticking of the governor mechanism which permits the speed to exceed 1,950 revolutions per minute, an emergency governor mechanism, entirely independent of the mechanism previously described, comes into play and closes the main throttle valve, bringing the compressor to rest.

Oil Supply.

In all high speed apparatus the certainty of the oil supply is an important feature and it is particularly so in this service. In this unit there are three shaft bearings requiring automatic lubrication, and this is furnished by a valveless gear pump, worm-driven from the main shaft, which circulates oil under 15 to 25 pounds pressure. The same pump also supplies this necessary oil to the hydraulic cylinder which actuates the valve gear. The oil is returned from bearings and cylinder to a tank where it is settled and strained before it is again used. To guard against any stoppage of oil circulation, an alarm is provided which causes a steam whistle to blow in case the oil pressure falls to 5 pounds per square inch. The oil is cooled in the bearings, at the point where the heat is generated, by means of water-cooled coils embedded in the bearing linings.

This apparatus, of course, uses high pressure steam. Obviously, the compressor is equally adapted to the use of low pressure turbines as drivers, and so driven, affords a ready means of increasing the efficiency of existing plants containing reciprocating blowing engines, by the usual method of exhausting from the reciprocating steam cylinders into the low pressure turbine. Governing by volume of air discharged is equally applicable, and all the advantages of this system can, therefore, be realized. Increased efficiency of the plant to the extent of 20 to 50 per cent may be thus realized with a very moderate addition to the cost of the plant.

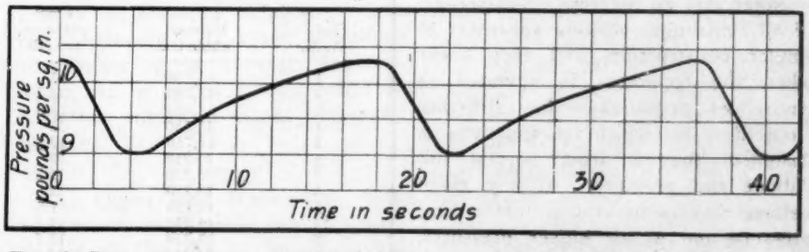


FIG. 6—PRESSURE CURVES, SHOWING PULSATIONS WHICH HAVE BEEN ELIMINATED BY THROTTLING THE INLET OPENING

The Original Installation.

The installation at the plant of the Empire Steel & Iron Co., shown in Fig. 1, was first operated March 8, 1910, and has since been in continuous service. At the time this apparatus was first placed in operation, it was not expected that the volume of air required by the furnace would be as low as it was later developed, the machine having been designed for a normal volume of 22,500 cubic feet per minute. When the machine was coupled to the furnace, it was found the volume required was only about 15,000 cubic feet per minute and the pressure corresponding to this volume, under furnace conditions, ranged from 10 to 12 pounds. Under

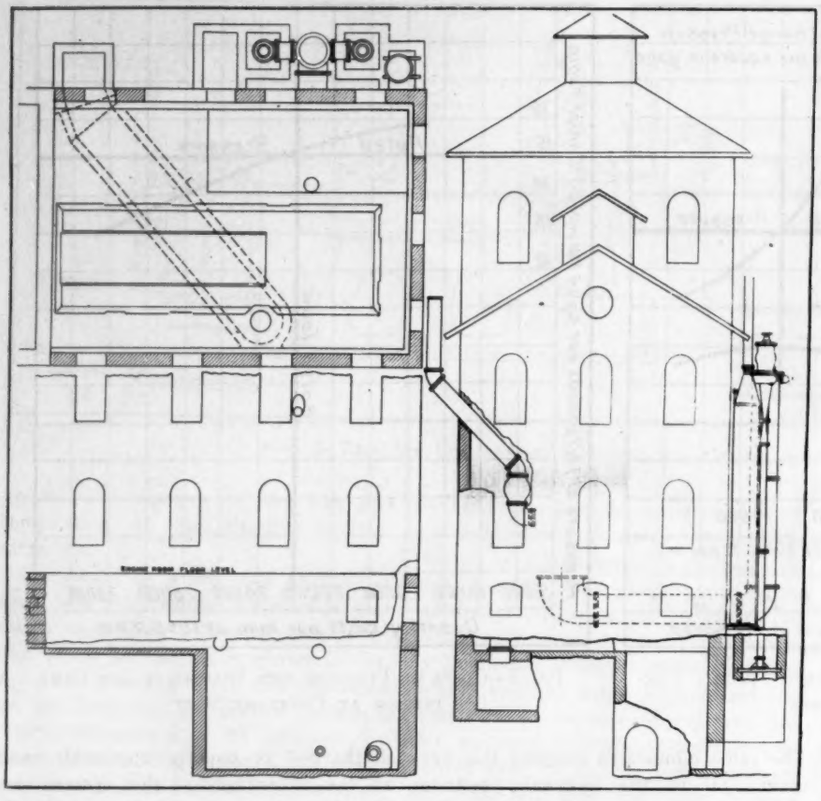


FIG. 7—PLAN AND SECTIONAL VIEWS AND END ELEVATION OF THE NEW ENGINE HOUSE, BUILT BY THE EMPIRE IRON & STEEL CO., AT OXFORD, N. J.

these conditions, it was found that pulsations were met with in the pressure line, this pressure fluctuating about 2 pounds, and to overcome this pulsation, it was found necessary to throttle the inlet opening. Fig. 6 shows the character and magnitude of these pulsations. To overcome this condition, a convenient butterfly valve throttling mechanism has been designed and applied, which eliminates these pulsations without appreciable loss of efficiency.

The pulsations in pressure, previously noted, are an inherent characteristic of all centrifugal blowing apparatus of similar construction, and they occur when the apparatus is operated at loads and pressures widely differing from those for which the apparatus is designed, that is from normal full volume and pressure. At any given volume they occur at a certain critical pressure and at all higher pressures, but do not occur at lower pressures than the critical. As volume is increased, critical pressure increases also. The critical pressure is slightly affected by the density of the air and the humidity. In Fig. 3 is given the characteristic critical pressure volume curve of this compressor.

The rate and extent of the pulsations are affected by the capacity of the discharge piping, stoves, etc., into which the air flows. The larger the capacity the longer the period or wave length and the greater the wave magnitude, and vice versa. Fig. 6 shows the pressure waves from the machine installed at the Oxford furnace. When tested in the shop, with very short piping of small capacity, the wave length was only a second or so, and of very small height.

The pulsations only occur at such loads at which the characteristic pressure curve of the apparatus is rising with increase of volume or remains horizontal, and the effect of the throttling is to superpose a drooping pressure curve, falling with increasing volume, which alters the shape of the resultant pressure curve and makes it droop also. As the throttling required to entirely remove such pulsations is only a few inches of water, it has no appreciable effect on the efficiency of compression. The curve of pressure and volumes for this compressor at constant speed is shown in Fig. 5.

At the time this article was written, the blast pressure at the Oxford furnace varied from 10 to 14 pounds, with volume constant at 16,000 cubic feet per minute. The speed varied from 1,500 to 1,600 revolutions per minute. The steam pressure averaged 135 pounds.

A 24-Hour Report.

The figures given in the accompanying table are taken from a typical station log, showing the variation of pressure and volume during a 24-hour period of operation.

The apparatus used for blowing the furnace before putting this machine in operation consisted of two vertical reciprocating blowing engines, each of the following dimensions: Steam cylinder diameter, 54-inch; blowing cylinder diameter, 72-inch; stroke, 72-inch; blowing cylinder displacement, 339 cubic feet per revolution each; maximum speed rating, 30 revolutions per minute each, giving 20,300 cubic feet per minute, total displacement;

ENGINE ROOM REPORT, EMPIRE STEEL & IRON CO., OXFORD FURNACE, OXFORD, N. J., MARCH 17, 1910.

Time. A. M.	Volume, cubic feet.	Blast pressure, pounds.	Revolutions per minute.	Steam pressure, pounds.	Vacuum, inches.
1	15,750	13	1,540	140	24
2	15,750	12.5	1,490	135	25
3	15,750	13.5	1,580	135	25
4	15,750	12	1,510	140	24
5	15,750	13.5	1,530	155	24
6	15,750	13	1,550	150	25
7	15,750	12.5	1,550	150	25
8	15,750	12	1,490	120	HP
9	15,750	11.5	1,500	130	HP
10	15,750	13.5	1,580	160	26
11	15,750	12.5	1,520	155	26
12	15,750	12.5	1,500	150	26
P. M.					
1	15,750	13	1,530	140	26
2	15,750	12	1,490	150	26
3	15,750	13	1,560	130	26
4	15,750	13	1,560	150	26
5	15,750	11	1,445	145	26
6	15,750	11.5	1,450	130	26
7	15,750	11	1,490	135	26
8	15,750	13	1,510	140	26
9	15,750	12.25	1,500	155	25.5
10	15,750	11	1,383	140	25
11	15,750	11.5	1,410	150	25.5
12	15,750	11.5	1,440	145	25

Furnace made 208 tons of iron in 24 hours.

actual maximum speed, 23 revolutions per minute each giving 15,000 cubic feet per minute, total displacement; average blast pressure, 8 pounds.

Judging from the revolutions of this engine, it was thought that the volume used was about 14,500 cubic feet. When the centrifugal compressor was placed in operation, an immediate increase in the amount of iron melted by the furnace, was experienced. The output increased from an average of 139 tons in 24 hours in February, 1910, to 176 tons in April, 1910, and the iron was found to be of a more uniform character, and the operation of the furnace was improved. The amount of air blown into the furnace has since been gradually increased and a corresponding increase in pressure required to force the air through the furnace has been necessary. This increase of air has resulted in an increase in the production of the furnace from 176 tons to the present average of about 190 tons. The machine is now operating with 16,000 cubic feet of air and the production of iron now averages 185 tons in 24 hours. It is proposed to continue this increase until the melt reaches 200 tons in 24 hours, the limit of the charging apparatus. The dimensions of the furnace are as follows: Diameter at bosh, 17 feet, 6 inches; diameter at hearth, 11 feet; diameter at top throat, 12 feet; height from hearth to dumping ring, 80 feet.

Condensing Apparatus.

The condensing apparatus is of the barometric type, and the injection water is supplied by a turbo-driven centrifugal pump, placed in the sub-basement. When the machine was first placed in operation, difficulty was had with the condensing water supply, which made it necessary to operate the machine non-condensing for a considerable period. Owing to the unfamiliarity of the fire room force with the new boilers which had been installed, it was even necessary to operate with steam pressures as low as 60 pounds per square inch gage for various periods, and under these conditions the compressor set operated with entire satisfaction.

As the condensing apparatus is of the barometric type, and the machine is operating far below its designed capacity, the difficulties involved in making an accurate boiler test to determine the amount of feed water under present conditions have prevented the making of tests to determine the actual efficiency of the machine. It is, however, furnishing considerably more air than the old machines, as is evidenced by the greatly increased product of the furnace, and at the same time it is operating with a smaller number of boilers and these are more easily worked than when operating with the engine.

Difficulty of Comparison.

There is great difficulty in making comparisons of the performance of this type of blowing unit with reciprocating types, either steam or gas-driven, owing to the absence of actual test figures, none of which permits of accurate and satisfactory comparison. From the results which have been obtained from all sources as to the actual performance of such machines and from actual experience with this machine and the sister machine, installed at the Northern Iron Co., Port Henry, N. Y., in line with tests which have been made in the factory, it seems that the following conclusions are correct in reference to this apparatus as compared with reciprocating engines for blowing blast furnaces:

1.—That the output of the furnace is increased on account of the greater steadiness of operation and more uniform conditions obtaining in the furnace.

2.—That the quality of the product is improved.

3.—That the steam consumption is equal to, or less than, that of compound engines blowing similar furnaces.

4.—That the engine room space occupied is only a fraction of that needed by reciprocating engines, either steam or gas.

5.—Considering all factors including consumption of fuel; cost of operation including oil and supplies, attendance, etc.; cost of buildings and foundations, interest on the investment and cost of maintenance of plant it seems fair to conclude that the centrifugal compressor is a blowing apparatus which can be operated for a lower net cost than any other means of blowing furnaces.

The Oliver Iron Mining Co., which took over considerable iron ore acreage in the locality of Baraboo, Wis., about three years ago, is giving evidence of activity. A. W. Rohn, local representative, and a force of engineers are now at work locating the first shaft, which is on the Cahoon property, just south of Baraboo. The shaft will be a three-compartment vertical, 18 by 8 feet outside dimensions. It will be sunk to 400 feet, from which point drifting will be done.

INDUSTRIAL SUBURB

Will be Established at Indiana's Capital—New Companies.

Indianapolis, Feb. 27.

A notable industrial movement has been launched by the Greater Indianapolis Industrial Association and an industrial suburb to be known as Mars Hill will be established just west of the city. The movement is a purely civic one, members of the association being representatives of the various local commercial bodies. On Feb. 20 the organization placed on sale 8,000 building lots at the uniform price of $400 each, and will improve the property with sidewalks, gravel streets and sewers.

About 200 acres of land has been reserved for factory sites and free sites and bonuses will be given to concerns from outside of Indiana locating in the suburb. The association already has under contract to locate here a large number of manufacturing concerns, whose identity will not be made known until the lots have been sold.

It is learned, however, that among the concerns under contract are the following: Machinery, to occupy 25 acres of floor space and employ 4,000; engine builders, to occupy 24,000 square feet and employ 300; locomotives and steel cars, to occupy 35 acres under roof, and employ 3,500; motorcycle and sundry machinery, to occupy 200,000 square feet and employ 1,500; ice machinery, to occupy 100,000 square feet and employ 500, and steel ranges and furnaces, to occupy 200,000 square feet and employ 1,000.

The Inter State Car Co. has made a number of improvements, made necessary by a recent fire in the plant. Buildings erected have been a foundry, 60 x 166; pattern shop, 40 x 50 feet; paint shop, 18 x 30 feet, and carpenter shop, 16 x 20 feet.

A foundry will be operated by the Acme Foundry Co., which has been organized by J. M. Haines, F. T. Taylor and J. L. Hall. The concern is incorporated with a capitalization of $10,000.

A large tract of ground has been purchased at Richmond by the Hayes Track Appliance Co., now at Geneva, N. Y. Several factory buildings will be erected and the company will move to Richmond when they are completed.

Notice has been filed with the secretary of state that the Ames Iron Works, of New York, has withdrawn from business in Indiana, and the appointment of R. C. Turner as agent has been revoked.

A Large Segmental Bucket

In blasting and dredging a deep water channel in the Delaware river at Schooner's Ledge, near Chester, Pa., some peculiarly difficult problems were faced by the United States government engineers, since the work was done in material consisting largely of rock. The handling of the displaced material with speed and efficiency so as to facilitate the rapid progress of the work, presented some mechanical problems more than ordinarily difficult, owing to the large masses sought to be removed. The solution was found in the adoption of an orange peel bucket of unusual proportions, built by the Hayward Co., 50 Church street, New York City, and shown in the accompanying illustrations. This bucket, which is believed to be one of the largest of its kind ever built, is 16 feet high, 12 feet wide when open, 10 feet wide when closed, and 5 feet deep. The bowl has a capacity of 6 cubic yards and it will seize and lift a single rock weighing up to 18 or 20 tons. The weight of the bucket is 14 tons. The great size of the bucket made it especially valuable by eliminating a large percentage of the drilling and blasting ordinarily required in channel work where very large boulders are encountered and where blasting is necessary, conditions which were found in making the Delaware river channel.

For this rock work, as the design of the bucket shows, the sides of the blades are cut away, allowing parts of irregular-shaped bodies to project through the spaces so made and thus facilitating hoisting adjustment, as well as equalizing the strains in the blades and arms. The bowl in this shape will also dig and raise a considerable quantity of small material, the closed portion of the bowl below the openings being 5 feet 5 inches in diameter and 1 foot 6 inches deep. This form of blade also facilitates running-off the water, leaving only the net load of material to be hoisted from the surface. The blades with sides removed are 5 feet across and weigh, with the arms, approximately 2 tons each.

For operating in soft material or small rock where the bucket will dig and fill to its capacity, plates are supplied and bolted or riveted to the sides of the blades, thus forming the full size closed bowl of 6 cubic yards capacity. This bowl is 10 feet in diameter and 4 feet 5 inches deep, and the distance from the bottom of the lower center casting to the points of blades when closed is 5 feet 3 inches. To the upper lugs of this center casting are secured the frames which support the power wheel shaft on which are fitted the two cams and the power wheel. The cams are 12 inches face and are designed to give a minimum and maximum power at the points where most needed during the operation of digging. The power wheel is 5 feet in diameter, 12¾ inches face and will accommodate a 2-inch diameter operating or closing chain. The power wheel shaft is 6 inches in diameter and is supported at four points by the inner and outer power wheel frames.

The inner power wheel frames extend to a point above the power wheel, where they are connected by a casting which also acts as a stop when the bucket is entirely closed. The outer power wheel frames are of forged steel.

The side, or cam chains, are made up of 180 links of 3 x ¾-inch steel and 1⅛-inch rivets and when the bucket is open, extend from the upper center shaft a distance of 7 feet 4 inches to the cam pins.

The upper center and blade arms are connected by forged steel connecting rods 8 feet 6 inches long weighing about 1,250 pounds each, and

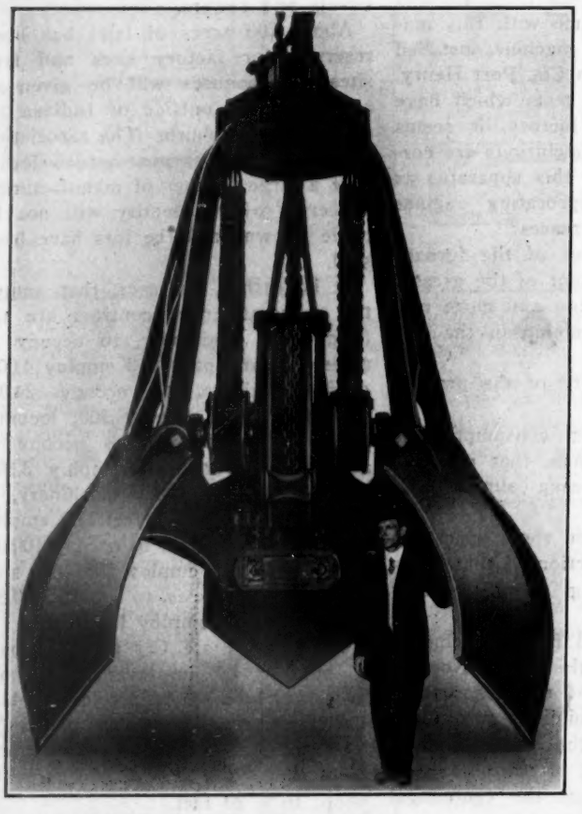


FIG. 1—SEGMENTAL BUCKET WITH BLADES OPEN

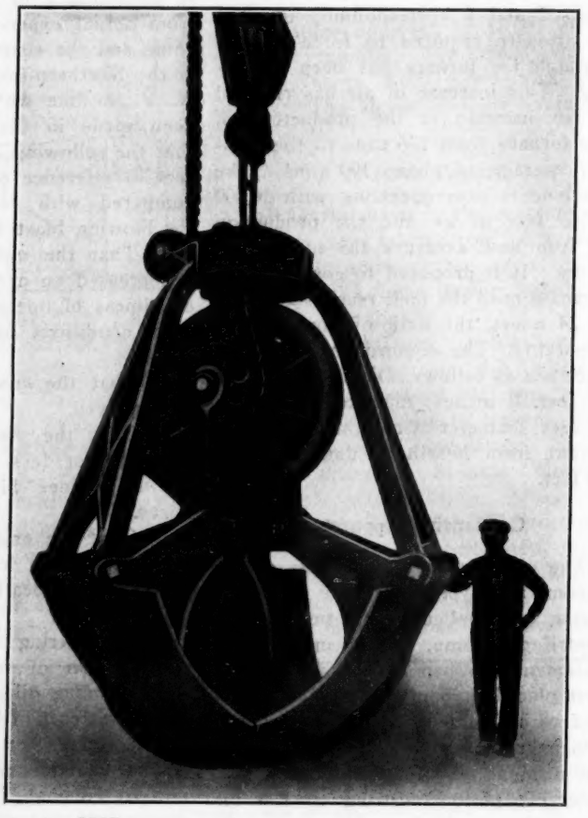


FIG. 2—SEGMENTAL BUCKET WITH BLADES CLOSED

designed to properly resist side strains when digging in rough or miscellaneous material. The upper center is a steel casting weighing about 2,500 pounds and carries the upper center sheave, the shaft on which the side chains are hung and the three connecting rod pins.

The bucket when open is nearly 16 feet high and if operated in a caisson, a minimum diameter of 20 feet would be required. When closed the bucket is 13 feet 6 inches high and 10 feet 4 inches in diameter.

The complete bucket weighs about 15 tons and is capable of holding a load of 8 tons or more and when properly connected with the operating machinery is under the absolute control of one man.

Attempt to Damage New Furnace

Two heavy charges of powder were exploded the night of Feb. 24, at the site of the new blast furnace being erected at South Chicago by the Iroquois Iron Co. The explosions followed each other by an interval of about half a second and did considerable damage to buildings in the locality. No particular damage was done to the new furnace now under construction. There has been no labor trouble at the plant and officials of the Iroquois Iron Co. are unable to account for the motive which actuated the persons who attempted to damage or destroy the new furnace.

Strikes on the Pacific Coast

The molders, blacksmiths and machinists are on strike in the shops of the Bakersfield Iron Works, Bakersfield, Cal. The foundry was closed by the management a day before the molders had decided to present their demand for an eight-hour day. The blacksmiths then demanded an eight-hour day and quit when their demands were refused. The machinists resigned to avoid being drawn into the contest. Pacific coast authorities think that this is part of a general policy to get all of the molders out all along the coast before next September.

Stoveplate molders in Portland, Ore., are on a strike for an increase in pay of 5 per cent. They work piecework and receive from $4.50 to $5 per day.

The Delaware River Steel Co., Chester, Pa., relighted its blast furnace, Feb. 19, after an idleness of six months, during which and following a damaging fire repairs were made.

TONNAGE CARRIED

By Bessemer Railroad Exceeded Previous Records.

The Bessemer & Lake Erie Railroad Co., a subsidiary of the United States Steel Corporation, during the year 1910 handled a total of 13,405,401 net tons of freight, a gain of 815,362 net tons over the preceding year. The total ore tonnage handled in 1910 amounted to 7,214,296 net tons, as compared with 7,555,298 tons in 1909, a decrease of 341,002 tons. Ore shipments up to Sept. 1, 1910, exceeded those of the corresponding period of 1909, but shipments fell off considerably after Sept. 1. Aside from the 7,214,296 tons of ore handled last year, the bulk of the remainder of the total tonnage for the year consisted of coal shipments north from Pittsburg.

Ore shipments over the Bessemer & Lake Erie railroad during the past 14 years were as follows, net tons: 1897, 500,428 tons; 1898, 1,655,101 tons; 1899, 2,437,708 tons; 1900, 2,684,051 tons; 1901, 3,622,038 tons; 1902, 4,685,933 tons; 1903, 4,379,180 tons; 1904, 4,578,196 tons; 1905, 5,820,268 tons; 1906, 5,954,298 tons; 1907, 6,544,369 tons; 1908, 5,280,825 tons; 1909, 7,555,298 tons; 1910, 7,214,296 tons.

The company's main line extends from North Bessemer, Pa., to Conneaut Harbor, a distance of 144.57 miles. Rapid progress is being made on 6 miles of double track work, which will be completed within the next two months. This will give the company a double-track line the entire distance between North Bessemer and Conneaut Harbor, with the exception of about 18 miles, which is taken up by bridges, viaducts, etc. On Jan. 1 of this year the company had 507,753 steel cross ties in service.

The total operating revenue of the company in 1910 was $7,602,131, as compared with $7,112,828 in 1909, an increase of $489,302. The net revenue in 1910 amounted to $3,044,160, a decrease of $254,926, as compared with 1909.

Pig Iron Club.—The annual dinner of the Pig Iron Club, composed of employes of the Jones & Laughlin Steel Co., was held Feb. 23, at the Hotel Henry, Pittsburg. J. D. Chisholm presided as toastmaster. E. H. Faris delivered an address on "Organization and Its Principles"; E. H. Walters spoke on "The History of the Blast Furnace"; W. B. Ebkin, "The Humorous Side of Furnace Work"; F. M. Gaston, "Smiles"; J. H. Bradley, "Short Circuits—Electrical and Human"; A. L. Truasch, "Some Entertainments", and T. S. Davidson, "The Hammer, Its Proper and Improper Use".

Warwick Furnaces Take Over Heckscher Bookings

By the terms of a deal just announced whereby the Warwick Iron & Steel Co.'s furnaces, Pottstown, Pa., take over the low phosphorus business on the books of Richard Heckscher & Sons furnaces and the iron ore on hand, it is understood that about 10,000 tons of orders and 40,000 tons of ore are involved, leaving 10,000 tons of pig iron to be sold. The Heckscher furnace is on low phosphorus, but it is going on basic to supply the increased needs of the Alan Wood Iron & Steel Co., its controlling company.

Will Have New Plant at Easton, Pa.

President W. G. Farrell, of the Stoever Foundry & Mfg. Co., Myerstown, Pa., reports that his company will abandon its present plant and locate at Easton, Pa., before the end of the year. The Easton plant will be new in every detail, will be equipped with modern tools and the capacity of the concern will be doubled. The old plant at Myerstown will be for sale or for rent. This concern manufactures pipe threading and cutting-off machines, boiler fronts and shaking and dumping grates.

Welsh Tin Plate Trade

Swansea harbor trust returns for the week ending Feb. 4, with comparisons, follow:

	Week ending Feb. 4. Boxes.	Previous week. Boxes.	Corresponding week last year. Boxes.
Received	106,960	105,155	101,815
Shipped	184,534	22,799	106,757
Stocks	193,781	271,355	156,016

Barney & Smith Dividend

The Barney & Smith Car Co., Dayton, O., has declared a dividend of 2 per cent on the preferred stock, payable March 15. This is the first dividend declared in nearly two and one-half years. The total default in that time amounted to 20 per cent, or $500,000 on the entire issue of $2,500,000.

Ohio Seamless Tube Co., Shelby, O., has increased its capital stock from $350,000 to $1,000,000.

ORE MOVING SLOWLY

From Docks to Furnaces—Lower Lake Shipping News.

Reports from Lake Erie docks indicate that ore is not moving forward at normal rate. Of course the movement is always slow during the early months, but it appears to be especially so this year. Ore on dock was heavy at the close of navigation and the indications now are that the docks will bear a heavy balance when navigation opens. Never in the history of the business have 5,000,000 tons gone forward from dock to furnace during the winter months and as the amount on dock at the close of navigation was approximately 10,000,000 tons, it is clear that the dock reserve at the opening of navigation will be heavy. At the present rate of movement it is likely to be 6,000,000 tons.

The American Ship Building Co. has closed a contract with upper lake parties for a sand sucker to be 152 feet long, 36 feet beam and 10½ feet deep. She is to be completed in June. Two dump scows for the Great Lakes Dredge Co. are being built at the new plant of the Western Dry Dock & Ship Building Co., Port Arthur, Ont., which is a subsidiary of the American Ship Building Co.

The Mackinac Transportation Co., operating in the Straits of Mackinac, will shortly solicit bids for the construction of a new car ferry. Frank E. Kirby is now drawing the plans. The new car ferry will be 352 feet long and 60 feet wide with a capacity for 25 cars.

May Add New Department

The Page-Hersey Iron, Tube & Lead Co., Ltd., Toronto, Can., is considering the advisability of adding a butt weld and galvanizing department to its Welland plant. The details have not yet been worked out. The concern at present manufactures black and galvanized wrought merchant pipe.

Thomas Motor Reorganizes

Official changes have been made in the E. R. Thomas Motor Car Co., Buffalo, following the recent announcement that a controlling interest in this company had been acquired through the financial house of Eugene Meyer, Jr., & Co., of New York City. E. P. Chalfant has been made president and will direct the marketing of the product; F. R. Humpage, vice president and general manager in charge of manufacturing and purchasing; J. J. Ramsey, treasurer, and W. L. Gleason, factory manager. A charter for the E. R. Thomas Motor Car Co. of New York, capitalized at $2,400,000, has been taken out.

NEW PRESIDENT

Will be Chosen For New Pittsburg Crucible Steel Co.

A president will be elected in the near future for the newly organized Pittsburg Crucible Steel Co., which will build a large plant at Midland, Pa., on property purchased recently from the Midland Steel Co. The Midland properties were formally taken over March 1, and it is understood that the Midland furnace, which will be removed from the list of merchant furnaces, will be blown out the first of the month for relining. Work on the proposed new plant will be started in the near future, and in addition to improvements outlined recently, plans include a modern mill for the manufacture of agricultural shapes.

Lackawanna Steel Report for Year

The report of the Lackawanna Steel Co. for the year ending Dec. 31, shows:

Net income	$4,963,177	Inc.	$1,373,803
Other receipts	986,059	Inc.	664,217
Total income	$5,949,236	Inc.	$2,038 020
Interest	1,729,229	Inc.	122,979
Balance	$4,220,007	Inc.	$1,915.041
Depreciation	1,686,902	Inc.	160,045
Surplus	$2,533,105	Inc.	$1,754,996

The unfilled orders at the end of the year were 226,103 gross tons against 467,533 on Dec. 31, 1909, a decrease of 241,430 gross tons.

Build Railway Signals

The Gravity Railway Signal Co., Richmond, Va., has just been organized with $500,000 capital stock for the manufacture of railway signal systems. The officers of the Gravity company are: President, W. H. Woody; vice president, C. G. Burton; secretary and treasurer, William H. Campbell.

The Nova Scotia Steel & Coal Co., Ltd., has declared the regular quarterly dividend of 1½ per cent on its common stock. The last previous disbursement was 1¼ per cent. The company has also declared the usual quarterly dividend of 2 per cent on its preferred stock, both dividends being payable April 15.

MODERN FURNACE

Will Replace Colonial Iron Co. Stacks at Riddlesburg.

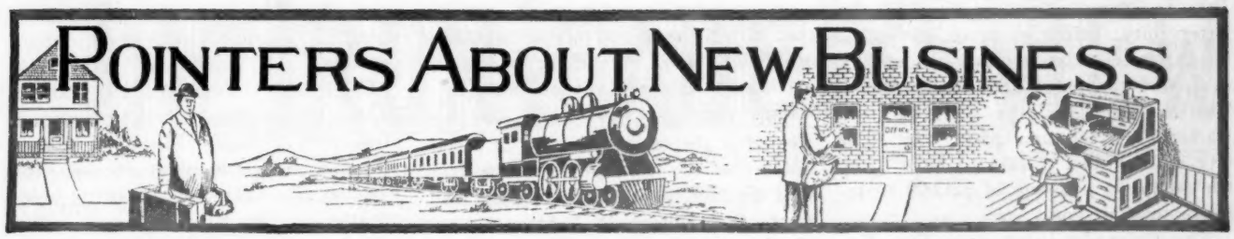
Contracts have been awarded by the Colonial Iron Co., Riddlesburg, Pa., for the erection of a modern, mechanically filled blast furnace, with complete complement of boilers, blowing engines and other equipment. The new furnace will be of 12-foot base, 18 bosh and 75-foot height, and will have a daily capacity of 250 tons. It will replace the present two alternate stacks at Riddlesburg and will more than double the output of the company. The present stacks, which are now in operation, will shortly be blown out and torn down. The first of these stacks was built in 1868 and the second in 1870, both being blown in the year following their completion. The No. 2 stack was remodeled in 1906. Each is 60 feet high with 14-foot bosh, and together they have a rated annual capacity of 36,000 tons. Work upon the foundations of the new furnaces was inaugurated this week. The Wm. B. Pollock Co., Youngstown, has the contract for the erection of the shell and the boilers will be of Rust type. The order for the blowing engine has not yet been placed. The new plant is expected to be operating in July or August of this year. The Colonial Iron Co. manufactures foundry iron exclusively and its brands are well known in the trade as the Norway and Colonial. Local, lake and New York state ores are used in the mixture. The company has its main office at 149 Broadway, New York. Recently it increased its capital stock from $200,000 to $300,000.

Iron Ore Report.—An extended report, treating of the Iron river iron bearing district of Michigan, generously illustrated by means of photographs and a contour map of the locality discussed, has just been issued by the board of geological and biological survey of the state of Michigan. It is Publication No. 3 of geologic series No. 2. The work describes the structure and characteristics of the ores mined in this territory. Several ore production tables are also included.

Meadows Mfg. Co., Pontiac, Ill., has certified to an increase in capital stock from $40,000 to $70,000.

Kettler Brass Mfg. Co., Houston, Tex., has increased its capital stock from $30,000 to $60,000.

POINTERS ABOUT NEW BUSINESS



(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing companies have filed articles of incorporation:

Ohio Iron Works Co., Cincinnati; $100,000; by A. E. Otte Jr., and others.

The Acme Foundry Co., Indianapolis; $10,000; J. M. Haines, F. T. Taylor and J. L. Hall.

The Wells Foundry & Machine Co., East Gary, Ind.; $40,000; by George Earle, William Earle, V. E. Cook, S. E. Cook and C. W. Barnes.

The Central Foundry Co., Oklahoma, Okla.; $25,000; M. K. Weigard, Garrett A. Walsh and L. V. Bath. Two buildings will be erected.

Connor Machine Co., Ltd., Exeter, Ont.; capital, $40,000; provisional directors, Walter Connor, George P. Connor and Luther J. Penhale.

The British Canadian Explosive Co., Ltd., incorporated in Britain, has been authorized to carry on business in Ontario with head office at Toronto.

The Norfolk Iron Corporation, Norfolk, Va.; $125,000; by Paul W. Howard, president, Norfolk, Va., and A. Brinkley, vice president, Portsmouth, Va.

The Auto Specialty Mfg. Co., Indianapolis; $10,000; by A. T. Purcell, M. V. Wiggins, G. W. Dollarhide, F. E. Floyd and J. L. Floyd; to make auto parts.

The York-Tinker-Kraft Novelty Co., Cleveland; $50,000; enameled steel products; by David A. York, Charles T. York, Justus A. Tinker, A. W. Kraft and M. A. Smith.

The Co-operative Manufacturing Co., Winnipeg: capital, $500,000; by A. L. Nielson, C. Roberts, G. F. Hayes and Frank Hayes; to manufacture farm implements and machinery.

The Davis & Siehl Co., Cincinnati; iron fences, structural iron and steel products of all kinds; $30,000; by J. Frank Davis, C. Fred Siehl, John D. Berger, Carl W. Sield and Gottfried H. Voicks.

The Johnson-Morse Can Co., Wheeling, W. Va.; $1,000,000; by George A. Laughlin, Alexander Glass, Albert C. Whitaker, Oliver J. Johnson, Joseph Wells, Wheeling, W. Va.; A. A. Morse, LaCrosse, Wis.

New Construction:—

Wood Bros. Steel Self Feeder Co., Des Moines, Ia., announces that an addition estimated to cost $150,000 will be built to its shops in a short time.

The International Steel & Iron Construction Co., Evansville, Ind., expects to erect a structural steel plant during the latter part of the summer of 1911.

The Western Steel Car & Foundry Co., Hegewisch, Ill., has taken out a permit to build a one-story steel car construction shop, estimated to cost $100,000.

The Richmond & Holmes Foundry Co., St. Johns, Mich., is making some improvements to its factory to permit it to manufacture a line of cement tile machinery.

The Chattanooga Armature Works, Chattanooga, Tenn., is having plans prepared for a two-story steel and brick factory, 47½ x 235 feet, estimated to cost $5,000.

The Beatrice Iron Works, Beatrice, Neb., has begun work on the construction of an addition to the cultivator factory. The addition will more than double the present capacity.

The New Process Foundry Co., offices at Canton, O., has not yet decided in regard to the location of its proposed plant. The concern will manufacture radiators, screws, castings and general duplicate work.

The Western Boiler Pipe Co., Monmouth, Ill., advises that definite plans have not been settled upon relative to its proposed building at Des Moines. but it expects some definite announcement can be made shortly.

The Ralston Sheet Metal & Iron Works Co., Kansas City, Mo., is erecting a new plant in Kansas City, Kan., at Thirteenth and McAlpine streets, which will be ready for occupancy very shortly. The new plant will more than double the works' capacity.

The Indianapolis Drop Forging Co., Indianapolis, reports that it is adding 500 horsepower to the capacity of its boiler room and installing stokers, a purifier system and a new engine in the engine room. Contracts for all of the equipment have been let.

The American Can Co., whose Philadelphia branch occupies leased quarters at Twenty-first street and Washington avenue, has taken an option on a portion of the Neafie & Levy property, Beach, Allen and Palmer streets. It is said to contemplate plant erection at that site.

Construction of the last unit of the new plant of the Greene Engineering Works, Douglas avenue, Racine, Wis., has been started. It is the office and administration building, to be two stories high, of brick and steel. The other buildings include main factory, warehouse and power plant.

The Central Foundry Co., Oklahoma City, Okla., whose incorporation has been noted, will build a steel foundry of brick, one story, 50 x 150 feet, and in addition will erect a fire proof building, 35 x 40 feet, in which to store patterns. The company proposes also to manufacture gray iron products.

The Hayes Pump & Planter Co., Galva, Ill., recently made an appropriation of $30,000 to be expended for improvements during the year 1911. A large part of this sum will be used in the construction of a modern foundry of brick and cement. Architects are drawing plans for the proposed new construction.

Thorp, Hawley & Co., Detroit, are building a new factory, 40 x 140 feet, five stories and basement, of reinforced concrete. They expect to expend $25,000 for machinery, tools and fixtures. The output will be increased 40 per cent. It is expected that the new building will be completed and occupied by April 1.

The Camillus Cutlery Co., located in Camillus, a few miles from Syracuse, N. Y., is planning to increase the output of its factory and employ a much larger force as soon as houses can be built to accommodate the new employes. The factory now gives employment to 300 men and women and the weekly production amounts to 2,000 dozens of knives.

The Dildine Steel Bridge Co., which has decided to remove from Cameron,

Mo., to Hannibal on account of the latter city offering more favorable freight rates, has erected a building estimated to cost $20,000 at Hannibal. The machinery will be removed from Cameron to the new plant site. The city of Hannibal is said to have given the company a bonus of $21,000 to remove to that point.

The Colorado Ingot Iron Pipe Co., Manitou, Colo., is preparing to build a plant at Colorado Springs, estimated to cost $10,000. The building will be of brick and stone, 200 x 400 feet. Better transportation facilities have decided the company to build the new plant at Colorado Springs. The officers are: President, William Lennon; vice president, H. H. Grayton; secretary and treasurer, L. E. Bennett.

C. H. Ruggles, president of the South Houston Iron Works, South Houston, Tex., will begin this week the erection of a foundry and machine shop at Tuscaloosa, Ala., for the manufacture of tram logging cars and general machine work. A frame building will be erected containing a machine shop 30 x 50 feet and a foundry 40 x 50 feet, in which equipment estimated to cost $5,000 will be installed.

The McFarland Foundry & Machine Co., Trenton, N. J., manufacturer of miscellaneous castings, has just completed a number of improvements to its plant. These include extensions to the main foundry building, and a new two-story structure. The first floor of the latter will be used as a chipping and cleaning room and the second floor as a brass foundry. This building was erected to replace the one destroyed by fire in July, 1910.

General Industrial:—

The Chicago Bearing Metal Co., Chicago, has increased its capital stock from $250,000 to $500,000.

The Northwestern Can Co., of Chicago, which had contemplated locating at Kenosha, Wis., has announced that it intends removing its plant to Brazil, Ind.

The Cincinnati Car Co., Cincinnati, has certified an increase in capital stock from $100,000 to $1,500,000, the proceeds from the sale of new stock to be used to erect new shops.

The O. U. Handy Tool Co., North Vernon, Ind., which was organized some time ago with $10,000 capital stock to manufacture auto jacks and a combination tool for farmers, has been placed in the hands of E. O. Hayman as receiver.

The Mora Power Wagon Co., Cleveland, whose incorporation for the purpose of manufacturing power delivery wagons was recently noted, advises that it will not erect further buildings or require any amount of additional machinery to carry out its design.

The following directors were re-elected at the annual meeting of stockholders of the Wheeling Steel & Iron Co., held at Wheeling, W. Va., Feb. 14: C. R. Hubbard, W. F. Stifel, George K. Wheat, W. A. Isett, Edward Hazlett, H. H. Hornbrook, George Wise, E. W. Oglebay and F. W. Bowers.

At the annual meeting of the stockholders of the Warren Foundry & Machine Co., Phillipsburg, N. J., the present board of directors was re-elected and it in turn re-elected the present officers, consisting of Wm. Runkle, president and treasurer; Wm. H. Hulick, vice president and assistant treasurer.

The site of the Laramie Rolling Mills, Laramie, Wyo., which were destroyed by fire Nov. 8, is being cleared and the ground devoted to other uses. Much of the scrap is being shipped to the plant of the Colorado Fuel & Iron Co. at Pueblo, Colo. Boilers and considerable machinery is being shipped to Omaha.

The Baxter Stove Co., Mansfield, O., advises that the increase in its capital recently noted was made in the form of preferred stock which was authorized for the benefit of some customers who wished to secure some of the Baxter Stove Co.'s stock. Practically all of the common stock is in the hands of members of the Baxter family.

Dawson, Pyles & Putschky, Inc., Fulton, N. Y., manufacturers of dump cars and manufacturers' supplies, have been awarded the contract for building a dredge, 33 x 100 feet, and three 200-yard bottom dump scows for the American Pipe & Construction Co., of Schenectady, N. Y., for use on its barge canal contract No. 37, just north of Fulton.

The Reliance Wrench Co., of Racine, Wis., recently incorporated for $25,000, has leased a two-story building on Douglas avenue and is now manufacturing automatic wrenches and other specialties. All castings used will be of crucible steel. All machine work and assembling will be done by the company. Andrew Matson is president of the company.

The Foundries Co., Orrville, O., which incorporated a number of months ago, has elected officers as follows: President, R. A. Kinney; vice president, H. D. Shannon; secretary, Alton H. Etling; treasurer, D. Ed. Seas. George Wendling, formerly with the Orr Foundry Co., is manager. The concern is operating a modernly equipped gray iron jobbing foundry.

The Ajax Foundry & Pattern Works, Milwaukee, recently incorporated, with a capital stock of $10,000, will take over the plant of the Elite Foundry Co. The Ajax company holds options on the Elite property, which will be sold under foreclosure within a few months. Christopher Stein is general manager of the Ajax company.

The Lewis Electric Welding & Mfg. Co., Toledo, O., recently incorporated, will continue to make valves and parts for automobiles, stationary and marine motors and motor parts, and conduct a general electric welding business. This concern, which had been in business for some time previous to incorporation, reports that it will continue to add equipment to increase its capacity.

The Peterson-Brown Co., Cleveland, whose incorporation was recently noted, advises that it has a patent stop plunger for locks and a patent self-locking sash lock, together with a new wood-working machine, which it will manufacture. It is the intention of the company, when sufficient stock has been disposed of to erect complete stamping and machine shops to manufacture its proposed product. It expects to average five machines per month, and from 15,000 to 25,000 dozen locks in the same length of time. All its goods are patented.

E. R. Hensel Steel & Copper Co., Security building, St. Louis, advising respecting the recent incorporation of the company, says that it succeeds E. R. Hensel, who has for a number of years acted as mill representative for a number of eastern manufacturers of finished iron, steel and copper products. The policy of the new company will not be changed in any way. It represents in St. Louis market some of the largest independent manufacturers of finished iron and steel products, and expects to continue in the same line.

Fires:—

The Winstanley Machine Works, Oshkosh, Wis., were recently damaged to an estimated amount of $400.

The foundry of the Wilder Strong Implement Co., Monroe, Mich., was damaged to the extent of several thousand dollars on the evening of Feb. 17.

The main factory building and warehouse of the Bonnot Co., manufacturer of machinery, at Louisville, Stark county, O., were badly damaged by fire, Feb. 22. The foundry was not damaged. The loss is estimated at $20,000, but is covered by insurance.